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No. 7

JOURNAL

Canadian
Dental
Association

L'Association
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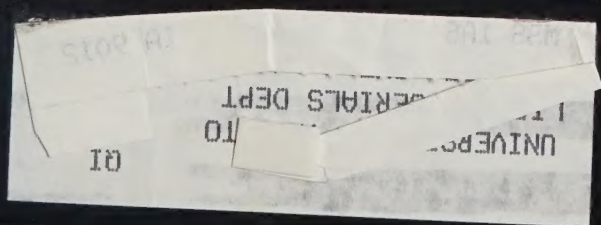
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July 1990

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The Canadian Dental Association serves the dental profession - and through the profession the Canadian public - as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all those interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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[†] Supragingival Calculus Formation Study: "A Study to Compare the Effects of Two Dentifrice Products on Adult Supragingival Dental Calculus Formation" 1989. Data on file, SmithKline Beecham Canada.

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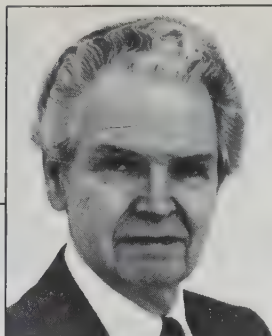
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Patriotism Is Not A House of Cards

This editorial was written in the last week of April, only two months before the June 23rd Meech Lake deadline. By the time these lines are read, a decision and/or compromise of some kind will have been reached.

What is unsettling about Meech Lake is how it has triggered that familiar debate on national unity. More than that, the stance that each province has taken on Meech Lake has clarified for all Canadians just how each province feels about its role in Canada, about Canada itself, and about how Canada treats its member states. In short, Meech Lake has turned out to be the Rorschach Test on national unity.

What hasn't helped is the murmurings of malcontents or alarmists who capitalize on such instances to assert that Canada is falling apart. Yet a healthy relationship often exhibits conflict, even discord, now and then. When change is imminent — as ratification of Meech Lake would signify — conflict frequently becomes the lynchpin of progress. If anything, conflict indicates engagement with the future, not indifference, and certainly not defeat.

Defeatism leads to quagmired thinking — the kind of thinking that throws the baby out with the bathwater. Detractors on both sides of the border have already whispered “annexation” as if relinquishing responsibility would solve all our problems. Entering into receivership, as it were, is not part of our history — a history somewhat chequered, but on the whole, conciliatory. Canada will go on whether the Meech Lake Accord is part of its future or not.

Whatever the decision on June 23rd, a national vision of Canada, a unified Canada, is too valuable, too dear to give up. Let's not shy away from a heartfelt nationalism. The intrepid discoverers, the hardy pioneers, the hopeful emigrants — some persecuted, some dispossessed — all have left too great an inheritance for the thinking Canadian to abandon with impunity. It hasn't happened in 150 years; we can't allow it to happen now.

William George Beers, a Canadian dentist of great distinction, addressed a similar self-doubt in 1888. A gifted rhetorician, he was invited to speak at a banquet given by the New York State Dental Association. Who would not, argued Dr. Beers, “despise the poltroon who carries his patriotism in his pocket . . . who would make patriotism a house of cards, and dollars the chief end of a people . . . People (cannot) measure their allegiance purely by commercial standards and . . . fear to face the difficulties which meet every nation, turning peddlars instead of protectors of their national birthright.” Throughout, Beers' speech evokes the pride of accomplishment, the promise of prosperity, and a belief in fulfillment that is just as valid today, more than a century later.

National unity cannot be founded on convenience — or, to describe it in pop psychology terms — on immediate need fulfillment. Ineffable though it is, national unity has more to do with perseverance, wisdom, and magnanimity — grand-scale thinking that withstands the test of time and geographical boundaries or considerations.

P.R. Crawford, BA, DMD

Editor: Journal of the Canadian Dental Association

President's Column

Working With the Dental Health Care Team



One of my goals as CDA President has been to improve communication with dental assistants and dental hygienists. This objective would recognize and support initiatives and projects with potential to assist the dental health care team to work more effectively in the patient's best interests.

Good communication requires a common basis of understanding. One of the first initiatives undertaken was the definition of a CDA position on supervision of dental hygienists. I chaired an ad hoc committee which attempted to recognize the valuable role of the dental hygienist on the dental health care team while preserving the vital principle of the dentist being responsible for diagnosis and treatment planning and for direction and coordination of patient care. I believe the resulting supervision statement, developed after a number of revisions, respects this principle. Its objective is to recognize the contribution of dental hygienists. However, it has been criticized as not doing justice to the role of dental hygienists in the public health setting. We are still reviewing the supervision statement with dental hygienists and I hope that we can achieve a common understanding. Sometimes it appears that dental hygienists and dentists are destined to disagree about the freedom of action appropriate for dental hygienists.

Politically, dental hygienists appear careful to leave their options open. A recent CDHA statement on "access to care" states that:

"In the interests of the oral health of the Canadian public, the Canadian Dental Hygienists' Association is committed to facilitating access to quality preventive oral health services provided by dental hygienists".

CDHA President Henry King subsequently provided reassurance that CDHA supports the concept of the dentist directing the oral health care team. So perhaps this statement has been placed in context. I still have concerns, however, because I recently had an opportunity to observe a presentation by the Ontario Dental Hygienists' Association to a commission reviewing health legislation in the Province of Ontario. The presentation included the following statements:

"Dental hygienists are skilled professionals able to provide a comprehensive range of preventive and therapeutic dental health care services, including periodontal scaling and root planing, without the order of a dentist, except in cases of medically-compromised patients"

"Restricting the provision of periodontal scaling and root planing as the review has recommended, is not only unnecessary, it also perpetuates dentistry's control over the dental hygiene profession as well as supports dentistry's economic self-interest."

Such statements are cause for grave concern and cast serious doubt upon the likelihood of ever achieving a statement of supervision of hygienists that would be acceptable to them. Dental hygienists are saying that they should be able to go ahead and treat patients without a dental examination or authorization. They are also accusing dentistry of economic self-interest rather than patient interest although the ODHA statement itself would seem to be a good illustration of just such a self-interested approach.

I make no apology for putting patient interest first and for seeking interaction with dental hygienists and dental assistants, in a team context that does not compromise patient interest. The CDA statement on supervision of hygienists, in this context, is an important statement of principle.

Dental assistants, who are also very important members of the team, appear to be in danger of getting caught between dentistry and dental hygiene. In Ontario, for example, the hygienists are opposed, not only to assistants carrying out scaling, but also to allowing Level 2 dental assistants to carry out functions such as the application of a topical anaesthetic. Hygienists are obviously attempting to protect what they perceive as their turf, while accusing dentistry of doing the same.

In fairness, one has to distinguish between positions taken by associations such as the ODHA and the position or feelings of the thousands of individual hygienists across Canada. It is clear, however, that when we attempt to do such things as define a CDA position on supervision, we must consider political as well as philosophical concerns because political initiatives in a province like Ontario have excellent potential to be imitated by groups in other provinces.

So where do we go from here to achieve the goal of improved communication with hygienists and assistants? First, CDA must continue to support the establishment of a national Level 2 dental assisting examination and the full and appropriate use of dental assistants within the oral health care team. Dental assistants work primarily with dentists; let's not abandon their interests or permit self-interest on the part of dental hygienists to interfere with this achievement. Secondly, we must continue to work with CDHA to explore how common ground with dental hygiene can be reflected in CDA positions. We must ensure that vocabulary and definitions of terms do not prevent us from understanding each other. We must show dental hygienists and dental assistants that we respect and value them. And we should support their aspirations when these are consistent with sound patient care as distinct from political self-interest.

It sounds impossible, and my experience to date does little to disprove this. I remain convinced, however, that it is worth the effort: that success will be achieved when the organizations representing dentistry, dental hygiene and dental assisting cooperate and work together in the same harmonious and effective fashion to be found in just about any dental practice across Canada.

Kevin L. Roach, BSc, DDS,
President of the Canadian Dental Association.

The Fluoridation Win in Calgary: A Success Story

Jackie Smorang, BA, RDH, MSEd

After 32 years and four failed fluoridation plebiscites, Calgarians on October 16, 1989, finally voted in favour of fluoridating the city's water supply.

Why was this plebiscite successful?

The four previous fluoridation plebiscites were conducted in 1957, 1961, 1966 and 1971. In 1971, when Calgary had a population of only 398,000, that plebiscite was defeated by a 10 per cent margin.

Three possible reasons may have contributed to the successful outcome of the fluoridation plebiscite last year. One reason could be that Calgary's population had grown to approximately 660,000 and a significant number of residents had not previously been given the opportunity to vote on this public health issue.

A second reason for success could be how the fluoridation plebiscite was initiated. A class of Grade 11 students from John G. Diefenbaker High School, after completing a science unit on water fluoridation, wrote to the mayor requesting that City Council consider a fluoridation plebiscite. In their January 5, 1988 letter, the students indicated that they had learned about water fluoridation, and as residents and future voters they wanted to realize its benefits.

After debating the request over a six month period, City Council approved holding a plebiscite on fluoridation during the 1989 municipal elections. City Council stressed it was not endorsing fluoridation but were giving Calgarians an opportunity to vote on the issue.

A third and maybe the most important reason for success could be that three interest groups supported fluoridation. Each group played an important but different role in the fluoridation campaign.

Profluoridation Efforts

The first group to concentrate its efforts to promote fluoridation was the Calgary Board of Health. Dr. Gerald Bonham, Medical Officer of Health, Calgary Health Services (CHS), felt it was a priority of the public health agency to educate the public regarding the benefits of fluoridation. To accomplish this goal an internal committee was struck to outline and implement an action plan.



The initial step was to survey the fluoride knowledge and attitudes of Calgary health professionals. Education programs and materials were subsequently developed for each health care group. A fluoride resource library was compiled and made accessible to CHS staff, health professionals and the public.

Monthly fluoride articles were written for professional and community association newsletters. Fluoridation presentations were conducted for interested groups, and pamphlets and posters were distributed throughout the city. Information was also shared with Calgarians through mall displays, and radio and newspaper ads.

Six weeks prior to the plebiscite a fluoridation information telephone line began operating. From 8:00 a.m. to 4:30 p.m., Monday to Friday, CHS staff answered the public's questions. A manual was written to assist staff in providing accurate and consistent answers. Each answer had at least one reference listed and this additional information was mailed to the public if requested.

Throughout the campaign, the role of Calgary Health Services was to educate the public. With its logo "Focus on Fluoridation", the messages always emphasized fluoridation was safe, effective and economical.

Dental Community Mobilized

The second group promoting fluoridation was organized by Dr. William Long, the President of the Calgary and District Dental Society (CDDS). He was responsible for mobilizing the dental community in support of water fluoridation. During the campaign dentists, hygienists and assistants concentrated on educating patients and the general public about the benefits of fluoridation. While providing scientific information, they also encouraged everyone to vote in favour of fluoridation.

To assist the dental community in preparing for the fluoridation plebiscite, the CDDS hosted a continuing education program with Dr. Joel Boriskin, a fluoridation campaign expert. CDDS also developed a poster and distributed it with

fluoridation pamphlets to all society members.

Dental professionals volunteered their time in the evening and on weekends to conduct presentations, distribute materials at mall displays and staff the Fluoridation Information Line.

The CDDS slogan "Water Fluoridation Means Better Dental Health For You! Vote Yes" helped promote fluoridation to the public.

Citizens Group

A third group rallied under the enthusiastic leadership of Penny Porter, a former dental assistant and mother of two. This group of interested citizens urged Calgarians to vote yes for fluoridation.

In order to generate visibility for their campaign the group registered itself as the Together For Fluoridation Society. After recruiting volunteers they formed committees to raise funds, to obtain endorsements, to speak to the media and at public forums, and develop and distribute promotional materials.

The Society focused its efforts on the "political" issue of fluoridation. This enabled the "experts" in public health and dentistry to respond to health issues raised by the media and the public.

Antifluoridation Efforts

Approximately five months prior to the fluoridation plebiscite, a small group which opposed fluoridation called the Calgary Safe Water Association (CSWA) became vocal on the issue. Their pamphlet and newspaper ads made many unsubstantiated allegations against fluoridation. The most damaging statement was that "fluoridation was unnecessary" as reported in the Journal of the Canadian Dental Association".**

About four weeks before the plebiscite the CSWA sponsored a news conference with a well known antifluoridationist.

The statements made by the antifluoridationist captured the media's attention, and consequently produced an element of doubt and confusion about the benefits of fluoridation amongst the voters.

Municipal Election

The 1989 municipal election was rather cumbersome for voters because of the number of issues facing the electorate. Complicating the fluoridation plebiscite was a second plebiscite to determine if Calgarians wanted compulsory water meters. On voting day the public was asked to cast six ballots for: a mayor, a ward alderman, school board trustees, a provincially-elected federal senate representative and the two plebiscites!

On October 16, 1989 Calgarians voted

53 per cent in favour of fluoridating their water supply. The fluoridation plebiscite was won by more than 12,000 votes, with a 48 per cent voter turnout.

Although each profluoridation group played a distinct role in the campaign, they shared information and coordinated activities. The collaborative effort amongst the three groups was effective in attaining a successful fluoridation plebiscite in Calgary. Δ

Author:

Jackie Smorang, BA, RDH, MSED,
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Health Education Division
Calgary Health Services

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** **Editor's Note:** The articles quoted out of context are:

Johnson, D.W., Grainger, R.M., Ryan, R.K.
Decline of Dental Caries. *JCDA* 5:411-417,
1986.

Gray, A.S. Fluoridation: Time for a New Base
Line. *JCDA* 10:763-765, 1987.

Dr. Bill Leggett installed as ODA President

Dr. Bill Leggett, who has practised dentistry in Brampton for more than 25 years, is the new President of the Ontario Dental Association (ODA). The ceremony took place during the association's semi-annual Board of Governor's meeting in Toronto.

In his address to the association's governors, Dr. Leggett stressed the importance of planning effective programs to preserve and build on the optimal level of dental care Ontario's residents currently enjoy. "I can't think of too many other professions which have been as successful as we have in providing the public with a real improvement in health."

Dr. Leggett also underlined the need for the profession to pool its resources to face challenges, such as the government's upcoming health legislation and new technology which will allow dental claims to be transmitted electronically. "Each of us should realize the power of collective action," he said, "and how much we can get done when we work together."

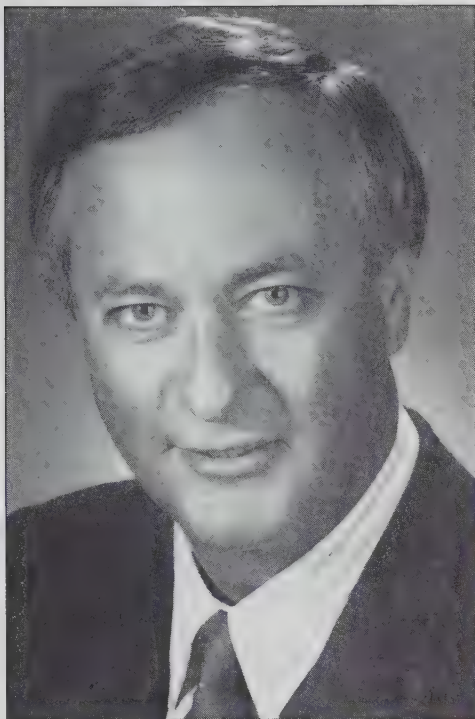
As vice-president of the ODA's Management Committee, Dr. Leggett fulfilled the key responsibility of overseeing the association's \$1.6 million budget.

He has served the ODA as a member of the Dental Practice Advisory Committee from 1980 to 1984, and as its chairman from 1984 to 1986. He also served as a governor on the association's board from 1978 to 1983, and again from 1985 to 1986. He has been a member of the Executive Council, the association's decision-making nucleus, since 1986.

He is a graduate of the University of Toronto (1963). While serving as ODA's President, he will continue to practise in Brampton.

Named President Elect

Hamilton dentist Dr. David Somer was installed as President-Elect of the ODA during the association's semi-annual Board of Governor's meeting.



Dr. Bill Leggett

As Chairman of the Management Committee, Dr. Somer will assume the key responsibility of overseeing the association's \$1.6 million budget, and the 5,300 dentists it represents.

During his term as the association's Vice-President, Dr. Somer played an important role in managing the purchase and renovation of the association's new headquarters in Toronto.

Dr. Somer is known locally as a spokesman on such dental issues as capitation and assignment. He has been involved in organized dentistry since 1965, and served the membership on a variety of committees, including the association's Executive Council (1988-1989). He also distinguished himself as a governor (1987-1988), as president of the Hamilton Academy of Dentistry (1987-1988) and as chairman of the association's Issues Management sub-committee. Dr. Somer is an instructor for the dental intern program for Hamilton civic hospitals.

He is a graduate of the University of



Dr. David Somer

Toronto Faculty of Dentistry (1965) and continues to practise in Hamilton.

New Vice-President

London dentist Dr. Peter Fendrich was elected Vice-President of the Ontario Dental Association at the Board of Governor's meeting.

This paves the way for Dr. Fendrich to be appointed president in 1992, during the association's 125th anniversary.

Dr. Fendrich is known locally as a spokesman on such insurance-related issues as capitation and assignment. He has been involved in organized dentistry since 1971, and has served the membership on a variety of committees. He was also President of the London and District Dental Society in 1987.

Dr. Fendrich is a graduate of the University of Western Ontario (1975). While serving as the ODA's Vice-President, he will continue to practise in London.

The ODA represents more than 5,300 dentists in Ontario. Δ

Sensitivity to Toothpaste

Tartar control toothpastes e.g. Crest (Proctor and Gamble), and Colgate (Colgate Palmolive) contain varying amounts of pyrophosphate which inhibits plaque decalcification and about 2 per cent of a flavouring agent, usually cinnamonaldehyde. Sixteen patients (three men 13 women) developed a variety of oral lesions shortly after starting to use such toothpastes.

The possible connection was studied by clinical examination, mucosal biopsy and patch testing of the toothpaste constituents.

The clinical signs and symptoms were variable but involved gingivitis (12 cases) and irregular ulceration (nine cases). Mucosal biopsies showed a range of features consistent with a topical reaction. Haematological investigations failed to detect any anaemia or latent nutritional deficiency. Patch testing gave a positive reaction to cinnamonaldehyde in nine patients. No other positive reactions to toothpaste constituents, Standard agents, flavouring agents or food additives were noted.

Ten patients with positive tests to cinnamonaldehyde underwent a toothpaste rechallenge after three weeks. After three days usage eight patients had a recurrence of their oral complaints though this again resolved after discontinuation.

At present the mechanism by which commercial products may produce oral lesions is not fully understood. Immunological investigation of some patients have revealed such reactions are a hypersensitivity rather than an auto immune process. An allergic basis has also been proposed for patients with orofacial granulomatosis since some are sensitive to cinnamonaldehyde. It appears that repeated and perhaps prolonged challenge is necessary to trigger oral symptoms.

It was concluded that adverse oral reactions to toothpastes most likely involve cinnamonaldehyde. A 2 per cent concentration seems sufficient to trigger oral reactions. Adverse reactions to toothpaste should be suspected in patients with non-specific oral lesions. Δ

Lamey P-J et al. *Brit Dent J* 168:115-118, 1990.

Meet the CDA Headquarters Personnel CFDE and ACFD



These two charming ladies are not members of the Canadian Dental Association's own personnel, but their activities are closely allied, in service to the dental profession of Canada.

Julie Hentschel, standing, is the Executive Secretary of the Canadian Fund for Dental Education, and basically coordinates and administers the daily operation of the CFDE office. She is involved in all the financial activities of the Fund. She assembles and prepares resource materials for Board meetings. Julie also prepares regular news releases and arranges annual audits. She files an Annual Report and Honor Roll and writes a CFDE Report for the CDA Board of Governors.

She develops appeal letters to the profession and firms for support for the Fund, and is responsible for payment of all approved grants.

Stella Taylor is the Executive Assistant for the Association of Canadian Faculties of Dentistry. A graduate of the Gregg Secretarial Business School in Liverpool, England, she later updated her skills as a graduate of Liverpool University's Business Administration school.

She coordinates and implements Executive Council policies and is the senior administrator for the ACFD. Stella also is the organization's meeting planner and coordinator. Another aspect of her activity is the coordination of communication between universities and colleges involved in dental education in Canada. She also acts as a financial advisor.

She is the administrative liaison with committees, the academics and the public. Δ

From — The DENTALETTER — April, 1990,
Vol. 7, No. 15, by special permission.

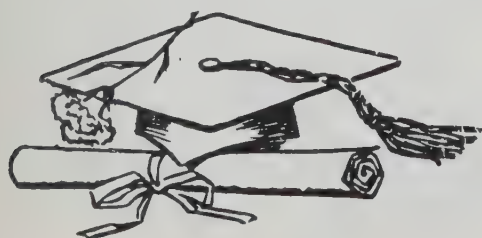
Canadian dental students gain distinction in research

Dalhousie student wins international honor

Mr. Kerim Ozcan, a third-year dental student at Dalhousie University, was announced as the winner of the 1990 David B. Scott Student Research Fellowship at the opening ceremonies of the recent meeting of the International Association for Dental Research (IADR) in Cincinnati, Ohio. Worth \$US 2,500 plus funds to support the research, the scholarship was set up and funded several years ago by Mrs. Nancy M. Scott in honour of her husband, Dr. David Scott, former director of the National Institute of Dental Research of the U.S. National Institutes of Health, and a past president of the IADR. The scholarship rotates each year to a different Division of IADR, and this year was offered in the Canadian Division.

During the tenure of his Fellowship, Mr. Ozcan will study the physical alterations of soft polymer gel systems resulting from the incorporation of various pharmacological agents under the supervision of Drs. D.W. Jones and W.C. Foong of the Division of Dental Biomaterials Sciences in the Faculty of Dentistry at Dalhousie University. This is a continuation of work that he has been carrying out over the past two summers in their laboratory.

A native of Montréal, Mr. Ozcan received his high school education in Chatham, New Brunswick, and a BSc with Honors in Biology, from Dalhousie University. He has also been the Dalhousie representative on the Canadian Dental Association's Student Affairs Committee and is currently Student Governor-Elect of the CDA. Δ



Dr. James Sandham, President of CADR, congratulates Karim Ozcan on his selection as the recipient of the Scott Fellowship, while Dr. Derek Jones, his supervisor, looks on.

Two students Win Canadian awards



Presentation of the Award to Mr. John Ley (centre) by Dr. James Sandham, President of CADR. Dr. Rex Holland, Mr. Ley's supervisor, looks on.

Mr. John P. Ley of the University of Alberta and Dr. Qi Zhang of the University of Toronto are the 1990 winners of the Canadian Association for Dental Research Student Awards in the undergraduate and graduate categories, respectively. Each award carries with it a cash prize of \$500, generously provided by Procter and Gamble Inc.

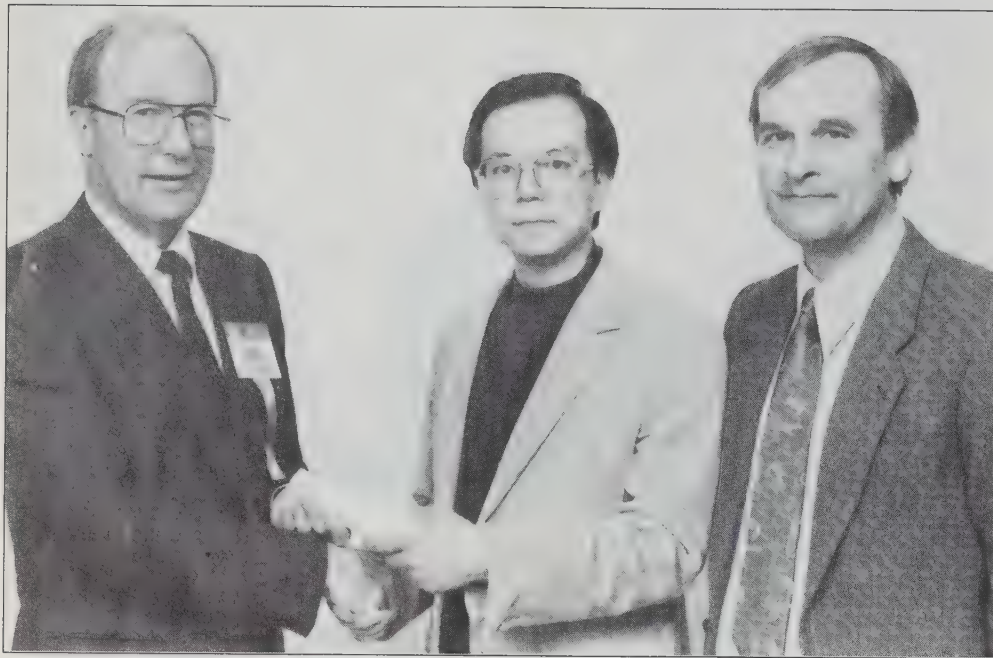
Applicants for the award were required to submit a description of their research projects and findings to CADR. Mr. Ley, whose work, "Trigeminal ganglion cell size after section of the inferior alveolar nerve of the cat", was supervised by

Dr. Rex Holland, holds a BSc degree in genetics from the University of Western Ontario. Dr. Zhang's research, "Isolation and characterization of the gene for secreted Phosphoprotein I (Spp I, Osteopontin)", part of his research to qualify for the PhD degree, was supervised by Dr. Jaro Sodek of the University of Toronto's Medical Research Council Group in Periodontal Physiology. Dr. Zhang is a dental graduate from the West China University of Medical Sciences in Chengdu, China. Prior to coming to Canada in 1986, he was on the teaching staff in the Department of Oral Medicine

at that institution. He subsequently spent a year as a Visiting Professor in the laboratory of Dr. Hardy Limeback, prior to his entry into the PhD programme.

Mr. Ley and Dr. Zhang subsequently

represented Canada in the annual Hatton Awards competition for novice investigators at the International Association for Dental Research annual meeting in Cincinnati in March. Δ



Presentation to Dr. Qi Zhang, with his supervisor, Dr. Jaro Sodek.

Mancini and Barrett Endowment Funds assist students

The Canadian Fund for Dental Education has announced that in 1990 guidelines have been established for the G.W. Barrett Memorial Fund and the Nicholas A. Mancini Fund, directing the annual income from each endowment to provide grants for students experiencing financial difficulties.

Two students, one in dentistry and one in dental hygiene, received grants of \$1,000 each in 1990.

There is little doubt of the appreciation of the students, and the CFDE would like to share the following: (names respectfully withheld)

From the G.W. Barrett Grant recipient

"My family and myself would like to express our sincerest thanks for what the CFDE has done for us. The funds reached

us at a time when our bank account was reaching its limits. We find the cost of living in the city and being a student to be very expensive. When I have completed my studies I intend to return to Labrador to work along the North coast. It is very difficult to get medical & dental personnel to work in this area. I would like to get more Native people interested in some aspect of the dental profession. Your contribution will go a long way in enabling me to attain my goal.

Again we thank you very much."

From the Nicholas A. Mancini Grant recipient

"I would like to take this opportunity to thank you for providing a fund for financially needy dental students. Your contribution to dental education is remarkable;

very few people go out of their way to show kindness to strangers these days, and I think our world needs more people like you.

If your fund had not existed, I am not sure how I would have survived for the next few school months! My parents are unable to support me right now, and although I was working three nights per week for the first few months of school, I found myself unable to keep up with my schoolwork . . . I hope that in the not too distant future I may pass along a similar kindness to a dental student. Your interest and support of dental students has made a great deal of difference in my life — because of you I am one step closer to realizing my dream of becoming a dentist.

The CFDE extends its sincere appreciation to Dr. Nicholas A. Mancini and to the family of the late Dr. G.W. Barrett, as well as the many individuals who have contributed to these endowment funds. Δ

Colgate-Palmolive again gives \$35,000 contribution to CFDE

For the third consecutive year, the Canadian Fund for Dental Education gratefully received a substantial contribution of \$35,000 from Colgate-Palmolive Canada in 1989 to support the CDA First Teeth Project.

First Teeth is the first integrated program from the CDA targeted at parents of children under nine years of age. It was developed by the CDA to help emphasize the importance and care of first teeth. Its ultimate goal is to help parents foster good, lifelong habits in their children.

The Program, developed in consultation with some of Canada's leading specialists in paediatric dentistry, has met with tremendous success and the demand for the kits has been overwhelming.

The First Teeth program can make a significant difference to the dental health of young patients, not only for now, but for the rest of their lives.

The Canadian Fund for Dental Education is grateful for Colgate-Palmolive's exclusive sponsorship in making this important program possible. Δ

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Dr. Barry J. Sessle is named Dean at University of Toronto

Dr. Barry J. Sessle, who since 1985 has held the position of Associate Dean (Research) in the Faculty of Dentistry, University of Toronto, has been appointed Dean and assumed his duties on July 1.

He succeeds Dr. Richard Ten Cate, who is now serving as Vice-Provost of Health Sciences at the University of Toronto and as chairman of the Commission on the Future of Health Care in Ontario.

Native of Australia

Dr. Sessle was born in Australia and received his Bachelor's and Master's degrees in dentistry from the University of Sydney and his PhD from the University of New South Wales. He then came to the United States for two years of post-doctoral research at the National Institute for Dental Research.

In 1971 he joined the Faculty of Dentistry at the University of Toronto as an Associate Professor, and in 1976, was promoted to the rank of Professor. He was appointed to the chair of the Division of Biological Sciences in the Faculty of Dentistry and professor in the Department of Physiology of the Faculty of Medicine, in 1978.

Lectures on pain

Dr. Sessle has lectured and published



Barry J. Sessle, BDS, BSc, MDS, PhD

widely in the field of pain, neuromuscular dysfunction and dental physiology, and has received numerous awards including the Basic Research in Oral Science Award of the International Association for Dental Research. He has also received continuous research support since 1974 from both Canadian and American granting agencies.

Dr. Sessle is an associate editor of the Journal, *Pain*, and a member of the editorial advisory board of the *Archives of Oral Biology Journal*.

He is a member and officer of several international research associations, has chaired a number of site visit teams to universities in the United States, has served on numerous committees in the University of Toronto's dental faculty and supported other areas of the University's activities.

Dr. Sessle has been the author or editor of five books, has almost 250 published papers or abstracts and has delivered more than 120 invited lectures in North America, Australia, the United Kingdom, Holland, Scandinavia, France, Japan, Hong Kong, Israel, Switzerland and Germany. His clinical and basic research interests include orofacial pain and neuromuscular function and dysfunction and their underlying mechanisms.

Dr. Levine, Acting Dean

In the interval between the end of Dr. Ten Cate's term and Dr. Sessle's assumption of the office, Dr. Norman Levine, Head of Paedodontics in the University's Faculty of Dentistry, served as Acting Dean. Δ

CDA's New Symbol

The Journal's cover this month is intended to introduce you to the new symbol and the new look for the Canadian Dental Association. The symbol was developed through 10 months of design work, consultations and deliberation on the part of CDA's Executive Council. This initiative is an integral part of CDA's overall plan to improve and expand its communication efforts.

The overall purpose of the new symbol is to convey a strong, clear, and contemporary image of the association. The symbol contains two key elements:

- The maple leaf, incorporating the symbol of dentistry, is a dynamic representation of the scope of the Canadian Dental Association. The maple leaf, like the CDA, is moving forward.
- The colours used in the identity are both eye-catching and professional. The red of the maple leaf symbolizes Canadian pride and spirit. The dark gray lettering is authoritative and dignified.

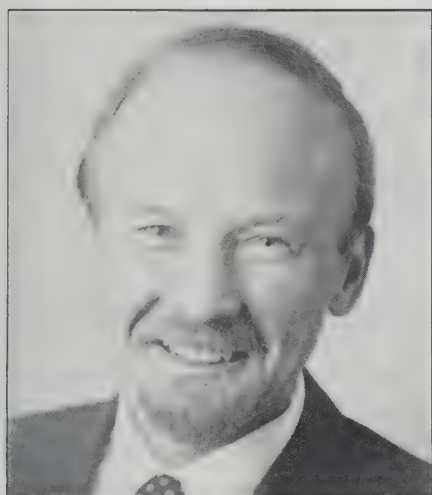
This symbol has been incorporated into a new look for many CDA materials. This clean, professional look maximizes the impact of the symbol and conveys the bilingual nature of the association. Together, the symbol and the new look create an image that builds on the traditions and principles of the past while looking ahead to the future.

In the weeks and months to come, this new symbol and look will be incorporated into all CDA materials. You'll see it on business forms, on communications to members, and on all printed resources. Δ



Becomes Royal College Registrar

Dr. Roger L. Ellis installed in RCDS post



Dr. Roger L. Ellis

Dr. Roger L. Ellis who has been serving as Deputy Registrar of the Royal College of Dental Surgeons of Ontario, officially assumed the mantle of the Registrar/Secretary-Treasurer of the College on July 1. He succeeds Dr. Kenneth F. Pownall.

Dr. Ellis, who has been Deputy Registrar since 1988, brings a wealth of experience in dental practice, administration, scholarship, and teaching to the post. Following graduation with honours from the University of Toronto in 1956, Dr. Ellis began private practice in Preston, Ontario. Ten years later, he went on to acquire two more degrees: a DDPH and an MSc, both awarded by the University of Toronto.

His publications represent an impressive body of work in areas ranging from the use of auxiliaries in private dental practice to group practice. In addition to some twenty scholarly works, he has been Principal Investigator on a number of grant-funded projects, most of which were devoted to improving the quality of dental care delivery.

The delivery of dental care seems to have been the focal point throughout much of Dr. Ellis' career activities. In addition to giving clinic presentations, he has also acted as consultant for a number of public and dental units.

Retires as RCDS Registrar

Dr. Ken Pownall steps down after 25 years in office

On July 1, Dr. Kenneth F. Pownall, who has served for 25 years as Registrar-Secretary-Treasurer of the Royal College of Dental Surgeons of Ontario stepped down from that post. In that period, he had done much to make the position and College synonymous with top flight dentistry and dental standards.

Practised in outposts

Upon graduation from the University of Toronto's Faculty of Dentistry in 1951, Dr. Pownall, provided dental care for children living in the outposts of northwest Newfoundland (under the auspices of the Canadian Red Cross. Distant and difficult of access, the outposts could only be reached by ship in summertime and snowmobile in the winter.)

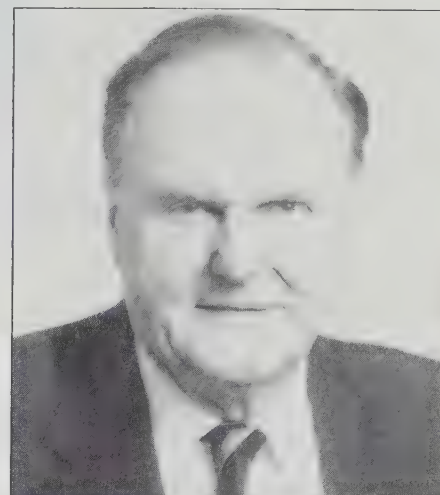
In 1952, Dr. Pownall returned to the Toronto area and opened a private practice in Etobicoke. A high profile activist in many dental associations, Dr. Pownall's energy and commitment contributed significantly to the enhancement of dentistry and dental care.

Over the years, he served as President of the West Toronto Dental Society; Councillor to the Toronto Academy of Dentistry; Governor of the Ontario Dental Association; Chairman of ODA's Public Health Committee, and a member of the Council on Public Health of the CDA. His appointment to the position from which he is now retiring came in February of 1965.

Extensive teaching experience

His teaching career spans two decades: ten years at the University of Toronto and nine years as Professor and Chairman of the Department of Dental Health Care at the University of Alberta. In 1976, he became a Fellow of the Royal College of Dentists (Canada), and the International College of Dentists (Canada) made him a Fellow in 1988.

Dr. Ellis' work has been and continues to be aimed at reconciling the ever-



Dr. Kenneth F. Pownall

In addition to his distinguished service as Registrar — Secretary-Treasurer of RCDS, Dr. Pownall also contributed to the reorganization of the ODA in his role as its Secretary-Treasurer.

Leadership in education

His participation in the educational branch of dentistry has been equally eminent. On staff at the University of Toronto's Faculty of Dentistry since 1962, his areas of academic expertise include forensic dentistry, the history of dentistry, ethics, and jurisprudence. He is also Honorary Lecturer at the University of Western Ontario and was a member of the Senate of the University of Toronto for seven years. Δ

evolving needs of the public with the practice and professional standards of dental care.

Healthful pursuits

Dr. Ellis indulges in spare time activities with the same zeal he devotes to dentistry. He became noteworthy in Western Canada when he helped establish programs and events for fellow joggers. The new Registrar is also an amateur photographer of distinction. Δ



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CDSPI Reports



CDIP Claims — Procedures to Follow

Every dentist who is insured should hope they never have to use the coverage they have purchased. The coverage is there as protection in the event of an unforeseen occurrence. It provides you with peace of mind.

The Canadian Dentists' Insurance Program (CDIP) is a group insurance program and, as with any group program, the number of participants and the number and size of claims have a significant impact on the premium. Since the CDIP enjoys the unity and support of the dental profession and has very high participation, each dentist helps the other maintain a viable insurance market for their program. Each participant is also contributing to the regulation of the premium dollar, which is based to some extent on the number of claims and the dollar cost of those claims.

There are now 12 separate plans of insurance which make up the CDIP. Claims can be broken down into two main categories, including those relating to Life and Disability insurance and those pertaining to General insurance such as Office Contents, Practice Interruption, Comprehensive General Liability and Malpractice insurance.

In most cases a dentist is unfamiliar with the procedures involved in making a claim under his or her insurance coverages. For this reason CDSPI has developed a claims procedure which, if followed, can remove most of the mystery and the inconvenience which some feel exists in this area.

Call CDSPI

The first and foremost step to take is to call CDSPI promptly to report a claim.

Service personnel are available to take appropriate action depending on the type of claim being reported.

Life and Disability Claims

For Life claims, the appropriate information will be taken over the phone and all necessary forms will be forwarded. If your claim is for Disability benefits, you will be forwarded a specially designed Claims Kit which includes documentation for filing of your claim. The Kit also includes instructions on how to follow the proper procedures to minimize any delay in the processing of your claim. It is important to fill out every section accurately and completely.

General Insurance Claims

For General Insurance claims, a Claims Kit is also sent. Immediately upon contacting CDSPI, you will be provided with the name and phone number of an insurance adjuster whom you should contact without delay. The adjuster, acting as the representative of the insurer, will then review your claim with you and assist you in completing the necessary forms. The Claims Kit provided by CDSPI at the time you report the claim helps you follow these steps from the initiation of the claim to its completion.

Prompt Attention

Our statistics, based on constant monitoring of claims activity, have shown that CDIP claims receive prompt knowledgeable attention, and are settled within a time frame that is very competitive within the insurance industry.

As in any business, it is possible to experience some minor difficulties, and in some cases some major delays before a claim is processed. From past experience, we know that the major delays in the processing of any claim, are either the submitting of incomplete information, or the inability to provide the necessary information due to inadequate records.

Regardless of what type of claim is being filed, the provisions of the contract under which the insurance is written must be followed. The insurer must not only follow the terms of the contract, but must also abide by definite claims procedures laid out by their corporate policy and directors. Only through such regulations can we be sure that claims administration by the insurers is properly handled and your premium dollar is fairly spent.

CDSPI Assists with Problems

If a claimant is satisfied that all the information has been provided and all forms completed, and there is still difficulty with the claim, a valuable feature of participating with CDIP is available. That feature is the written or telephone contact that you have with CDSPI, who will act on your behalf to investigate your problem, and assist both you and the insurer in resolving any difficulties that may have developed.

We hope you never have to submit a claim. However, if you do, you can rest assured that a system has been developed to make the procedure as painless as possible and to guarantee prompt and fair settlement of your claim. △

The DAP Advisor offers information, ideas and advice to improve dentist/patient communication, raise awareness about good dental health, and help your practice become busier.

Callout: Some Tip Sheet Pointers

- **Make sure the tip sheet is accessible and easy to locate.** Clip it to the inside cover of the patient's record and put it on coloured paper so it contrasts with the rest of the material in the file.
- **Keep entries short and to the point.** The tip sheet is meant to provide a brief "snapshot" of the patient, not a lengthy examination. Also, avoid gossip; entries should be positive and constructive.
- **Use the tip sheets as a team builder.** Make sure that everyone on your team is aware that any communication with the patient — no matter how impromptu or hasty — can yield valuable information that will help the dental team ensure patient satisfaction.
- **Pull the tip sheets and review them with your team members every day.** This will ensure that everyone is familiar with the patients you will be seeing, and will be able to provide personalized service.

Patient Profiles: Worth A Thousand Words

How well do you know your patients? If you were to delve into their dental records, you would undoubtedly uncover a lot about their dental history. But how much do you know about their needs, concerns, desires and expectations? These are the things that make patients tick. And if you and your dental team are attuned to this information, you can go a long way towards ensuring patient satisfaction — one of the keys to your practice's success.

A useful tool for getting to know your patients is the Patient Tip Sheet. A one page profile, the tip sheet summarizes salient information about the patient, and can provide insight into his or her personality. Here are just a few examples of what the tip sheet might include:

The patient prefers to be called. . .

Suppose your patient's given name is Wilhelmina but she prefers to be called Billie. Making note of her preference — and ensuring that everyone on the dental team is aware of it — enables you to provide a personal touch and can help put her at ease.

The patient values/is interested in. . .

Insights into your patient's lifestyle and values can provide useful information for the dental team. If you know that Billie, for example, is keen on swimming and tennis, she is obviously health and fitness minded. She might thus be receptive to dental health information that stresses how good dental health is integral to good health in general. And if someone on your team has observed and remarked on the tip sheet that Billie is appearance-conscious, you will have a valuable insight into how to position a treatment plan for Billie.

The patient is especially concerned about/sensitive to. . .

Say your patient is especially sensitive to the sound of the drill and other operatory devices. A notation on the tip sheet will flag this fact so you can remember to provide headphones during treatment. Another patient voices displeasure and keeps checking his watch when kept waiting for an appointment. Clearly, this patient values his time, and so should you. The tip sheet is the ideal place to store this information.

The patient was referred by. . .

The tip sheet is an ideal place to keep track of referrals: who referred the patient to your practice; what was the date of their first appointment; who has the patient referred; which dental team members have asked the patient to refer others to your practice; and when were these requests for referrals made? In the last case, it is important to indicate the date of this request, so the patient does not feel as though they are being asked for referrals too frequently.

Other Relevant Information

Marital status; names and ages of children; occupation. This general information can help complete your patient's profile.

(This month's DAP Advisor was inspired by "Paint a Patient Portrait," an article in the Summer 1988 edition of the American Dental Association's Dynamic Dental Strategies.)



The DAP Advisor is a service of CDA's Dental Awareness Program, an ongoing campaign dedicated to helping all Canadians keep their teeth Good For Life.

Sept. 3 deadline for Johnson & Johnson international awards

September 3rd is the closing date for entries for the 1991 Johnson & Johnson Preventive Dentistry Awards and applications are invited now by the Fédération Dentaire Internationale (FDI), which administers the worldwide competition.

A total of \$8,000 (U.S.), donated by the Johnson & Johnson Dental Care Company of New Jersey, is to be won, divided equally between two categories — Dental Research and Community Programs. Entries for the Awards have to be received at FDI Headquarters in London no later than September 3, so do not delay.

The complete rules of the competition may be obtained from, and entries should be sent to: The Executive Director, Fédération Dentaire Internationale, 64 Wimpole Street, London W1M 8AL, UK.

Entries should describe a new approach to preventive dental health in one of these categories. The J & J Awards are a worldwide competition, open to any person working in the oral health field, with the exception of employees of the Johnson & Johnson Dental Care Company and the FDI.

International juries of experts will select the winners, who will be invited to receive their awards at the FDI Annual World Dental Congress in Milan in October 1991. △

For further information, contact Caroline Southey, Public Relations Officer, or Sabina Webber, Assistant Public Relations Officer, FDI, 64 Wimpole Street, London W1M 8AL, UK. Telephone: 01-935 7852. Telefax: 01-486 0183.

Dr. Richard L. Pass of Burlington, Ontario was recently elected President of the Canadian Association of Orthodontists, at the annual meeting in Edmonton, Alberta.

At the same meeting, Dr. Yale Malkin of Vancouver, was named President-elect. Other directors of the executive are: Dr. Wayne Barro, of Dartmouth, Nova Scotia; Dr. Malcolm Yasny, of Toronto;

NO GENERATION GAP HERE!



These young instructors gained an impressive grasp of the intent of National Dental Health Month, 1990. Laura Love (age 11, above) and Brian Buettner (age 9, below) prepared their Dental Health Month displays for their school's Science Fair, then brought them to Lions Place seniors' residence in Winnipeg on April 3 to place them on display and to explain the importance of their messages to residents. About a dozen residents of the facility came to hear the presentations on opening day and were very impressed with the quality of the messages. The resident showing a keen interest in the presentations was Mr. Albert Riley. Brian spoke about "Hidden Sugars" and Laura's message was "Does Toothbrushing Remove Plaque" △



Dr. Terry Carlyle, of Edmonton, and Dr. Brian Hurd, of Burlington, Ontario.

Dr. Rowland D. Haryett was presented with the Distinguished Service Award in recognition of his outstanding contributions and exemplary service over many years for the benefit and advancement of the orthodontic profession and the Association. The award is the highest honor bestowed by the Canadian Association of Orthodontists. △

The American Academy of Periodontology has appointed Dr. Robert J. Genco as the new Editor of the Journal of Periodontology. Dr. Genco is the Chairman of the Oral Biology Department and an associate dean for Graduate Studies at the State University of New York at Buffalo dental school.

Dr. Genco succeeds co-editors Drs. Timothy O'Leary and William Hurt. △

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Mercury Toxicity

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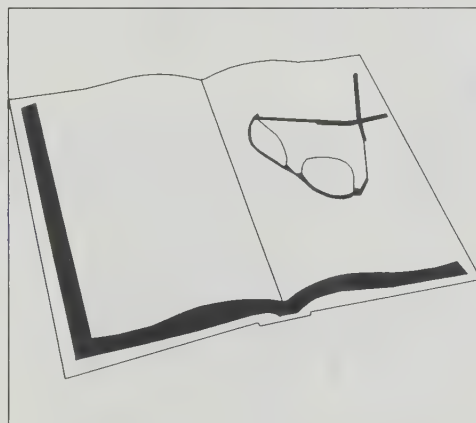
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PHARMACOLOGY AND PHYSIOLOGY IN ANESTHETIC PRACTICE

Robert K. Stoelting

*J.B. Lippincott Company
Philadelphia, Pa., 1987
859 pages*

This hard-cover book is written by one of the major authors in the field of Anaesthesia, Dr. R.K. Stoelting. While this book is directed primarily at those of us who practise in a hospital environment, it is an outstanding and concise review of Physiology and Pharmacology for any health professional. Unlike many such reviews, this book relates and applies these two basic sciences to actual clinical practise with the emphasis, of course, being on the practice of Anaesthesia.

This book is divided into two major sections: "Pharmacology" and "Physiology". Each section is further subdivided into a total of 58 chapters. Thirty-eight of these chapters are found in the Pharmacology section, 20 in the Physiology section. Each chapter in the book is nicely illustrated with the body of the text being directly referenced throughout. Each chapter is concluded with a thorough bibliography. A major surprise from a book of this type is how recent many of the references are. Within the limitations imposed by any review-type text, this book has kept very current with many of the research advances within the respective disciplines. It thus becomes much more than a neat rehash of familiar — albeit forgotten basic science material.

The first major section on Pharmacology begins with an extremely useful initial chapter on pharmacokinetics and pharmacodynamics. This becomes of vital importance to anyone administering drugs by the oral, intramuscular, intravenous, or inhalation routes. The section also includes chapters on every major pharmacology-related topic from nutritional considerations, sterilization, to the more "traditional" topics, such as the narcotics, sedative-hypnotics, local anaesthetics, etc., etc.

The Physiology section also covers the subject in a factual, complete and up-to-date manner. Again, rather than just listing facts, this book is able to incorporate a practical approach to its extensive presentation. It further emphasizes the

effects of administered drugs on the entire spectrum of body systems.

This book concludes with a useful Drug Index as well as an exhaustive subject index.

I feel that this book has a definite place in the library of any health professional. Dr. Stoelting has been able to bring together a vast amount of information in one book. Despite this, the book remains easy to read, is up-to-date, and is well referenced for the reader who wishes even more information about a particular topic. Δ

*This book was reviewed by:
Dr. E. Young, BSc, DDS, BScD, MSc,
FADSA, Assistant Professor of Anaesthesia,
The Faculty of Dentistry, University of
Toronto, and The Wellesley Hospital,
Toronto.*

COLOR ATLAS OF REMOVABLE PARTIAL DENTURES

by J.C. Davenport, R.M. Basker,
J.R. Heath and J.P. Ralph

*1988, B.C. Decker Inc., Burlington, Ontario
199 pages, Color illustrations and
photographs*

This Atlas uses 490 high quality color illustrations and photographs to illustrate the principles which govern successful treatment using clasp-retained partial dentures. The Atlas is divided into four parts. Part 1 deals with patient assessment including the anatomy of the denture bearing areas, history and examination, jaw relationships, primary impressions and articulators. Part 2 deals in some detail with partial denture design and includes a description of the Kennedy classification, surveying, retention, bracing and reciprocation, and connectors. This part concludes by illustrating how to use the basic principles to design partial dentures in a clear, logical fashion. Part 3 deals with the preparation of the mouth and includes a good section on initial prosthetic treatment (repairs, relines, restoring the occlusion on the old dentures, and interim prostheses). Preprosthetic surgery, eg. tuberosity reduction, removal of mandibular tori, removal of impacted teeth, and periodontal and orthodontic treatment are covered using a few selected photographs.

These sections of the Atlas are not extensive, but do give the reader an idea

of what can be done for the patient. Part 3 also includes an excellent section on the principles and techniques of tooth modification. The section clearly illustrates how the authors prepare posterior and anterior rest seats, retentive areas, and guide planes. Part 4 deals with the clinical procedures related to prosthetic treatment. Working impressions, jaw relations, trial insertion, the altered cast technique, denture delivery, recall and maintenance are all covered by a good selection of representative photographs and color illustrations.

The authors have used the color photographs and drawings to illustrate clearly the points they wish to make. The Atlas is not an exhaustive collection of every conceivable partial denture design or problem but it does cover the basic principles involved in the construction of removable partial dentures. However, there are no references in the Atlas apart from a list of suggested readings on some of the topics at the end of the book. In the Preface, the authors explain that they made a decision to omit any references in the Atlas. Although this book is an atlas, references would have helped to give some validity to the author's statements.

In conclusion, this Atlas would be an excellent companion to a conventional textbook on partial denture design. Dental students should find the color photographs and illustrations particularly useful in explaining a basic concept or to help visualize a clinical problem. Δ

*This book was reviewed by:
Dr. Richard B. Price
Assistant Professor Restorative Dentistry
Faculty of Dentistry
Dalhousie University
Halifax, Nova Scotia B3H 3J5 Canada*

STRATEGY FOR DENTAL CARIES PREVENTION IN EUROPEAN COUNTRIES ACCORDING TO THEIR LAWS AND REGULATIONS

Eds. R.M. Frank and S. O'Hickey

*IRL Press Limited
Oxford-Washington, DC 1987
262 pages, \$54.00 US*

This book is a collection of the papers presented at a Symposium on the topic of the book's title held in Paris in June, 1986. It reviews the current and past dental caries situation in 13 western

European countries from two perspectives: the dental preventive programs and the legislation governing dental prevention in each country. In addition, the first two chapters by Guggenheim and Ainamo, respectively, summarize the scientific basis of caries prevention and the caries decline in European countries. Guggenheim excellently reviews the rationale governing the various aspects of the preventive approach to dental caries; like others, he is pessimistic about the development and adoption of a successful caries vaccine in the near future. Of interest to readers in North America is the identification and package labelling of snack foods sold in Switzerland that meet certain criteria as "kind" or "safe" for the teeth. Ainamo, like some of the other authors in relation to their respective countries, carefully describes and clarifies the epidemiologic features of the caries decline (mainly in children) in Europe. Interestingly, he points out that there are great variations in this decline. These range from 80 per cent in certain 12 year-olds exposed to comprehensive preventive programs in Switzerland to no

real change in some age groups in the Federal Republic of Germany and France to actual increases in child dental caries in Greece. (Later it is learned that these latter three countries historically have not given strong emphasis to prevention, although current initiatives are underway.)

Dental preventive programs and legislation differ widely among the European countries. Indeed, this was one of the purposes of the book so that European governmental policy makers could be made aware of these differences and, in some instances, the large deficits in oral health status that may be associated with deficient programs. However, other than the almost universal suggestion that the increased use of fluoride toothpaste is associated with the caries decline over the past 10-15 years, no single factor emerges as explanatory. Among the 13 countries, water fluoridation is utilized to any degree only in two — Ireland and the United Kingdom. It is not allowed by law in France, the Netherlands, Belgium, Sweden, Denmark and Norway. While water fluoridation is legal in the Federal Republic of Germany, fluoridated milk

and salt — popular in some of the other countries — is not. However, presumably because of other individual preventive efforts and programs, reductions in caries have occurred in some of these countries without recourse to water fluoridation.

Most of the authors are internationally prominent. Most chapters are well written, clear and short. For those interested in dental prevention and policy, specifically, and in dental epidemiology, generally, this is a fascinating collection of informative papers. This is particularly true for North Americans who may not be familiar with the European situation and, particularly, the great variation in preventive programs and legislation, oral health status and, apparently, the impact of political philosophy among the various countries there.

*This book was reviewed by:
Dr. Don Lewis
Department of Community Dentistry
Faculty of Dentistry
University of Toronto*

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CFDE wishes to express special thanks to the publisher of this publication for its continued support.

Reader has problems with CDSPI 30th anniversary article

I am writing to you with regard to an article in the February, 1990 Issue of our Journal, entitled "CDSPI — It's Been Thirty Years."

As a Past President of CDSPI and before that a member of the RCDS Dental Services Committee, I was surprised when I read the caption to the photograph.

At the time of the 25th Anniversary of CDSPI March 1984, a special silver Anniversary booklet was prepared and distributed widely. I am sure it was used for reference material. It is a very good abbreviated history.

This is hardly a photograph of "the original CDSPI Management Committee," although this may be true in a literally legal sense. Nor is Dr. John Durran "the first CDSPI President."

Following the Urwick Currie Report, Dr. James Sim of St. Catharines became the first President of CDSPI. This report enabled CDSPI to stand on its own two feet, and no longer be a creature of the RCDS Dental Services Committee. This change ushered in the modern era which continues today. The annual report for July 1973 reads very much like today's. The insurance programs have been further refined and developed. However, one serious loss because of change in the insurance underwriter was the omission of the guaranteed increases provided in the disability insurance plans (without evidence of insurability) that was fixed to the inflation index, similar to that provided in our life insurance plans.

Two big additions are retirement counselling and DOMS, both of which I heartily endorse. I attended an excellent seminar on retirement given by Mr. Peter Dennett last October, and I recommend most emphatically that every dentist and spouse attend these seminars, and the sooner the better. Don't wait till you are retiring! You could be too late.

We in dentistry have the best insurance, retirement programs of all the professions in Canada. Our debt is to the pioneers in the late 40s and early 50s such as the Toronto Academy and others, to the United Casualty Agencies who went out to sell these policies to dentists all over Ontario, to the CDA Insurance

Practice Interruption Policy 'in need of a review?'

We feel that the Practice Interruption Policy administered by CDSPI is in need of a review.

A recent short circuit in a 600 Volt — 800 Amp power box that supplies the six story building in which we are tenants was attributed to wear and tear of equipment. Under the policy this is not an insured peril.

The building had to be evacuated by the fire department and it took until noon the following day to install a new electrical panel. In a smaller town it is unlikely that an electrician would be able to replace such equipment that quickly.

We were advised to submit a claim by CDSPI. It took two weeks to receive the claim form from the adjuster and two and one half months from the event to hear that the claim had been denied.

Rather poor service and a very limited Practice Interruption Policy is being offered by CDSPI.

Roy E. Foster, DDS
Geo. M. Griffiths, DDS
Dorval, Qué.

Committee over the years, leaders such as Dr. Wesley Dunn, Dr. David Way, Dr. Ernie Rollaston, Dr. Russ Hugill, Dr. Jack Glennie and a host of others (not forgetting former staff Mr. Gene Jackson and Mrs. Edith Schmidt). These people were all volunteers who gave freely of their time and expertise. Never in dentistry has so much been given by so few to so many for free.

I congratulate Dr. James Wright on his new appointment. He is an outstanding choice as your announcement indicates. Former RCDS and CFDS personnel are almost without exception most capable and as you know 1990 is the 75th Anniversary of military dentistry in Canada to be celebrated in Ottawa August 26 & 27 at the CDA National Convention. I look forward to seeing you there.

CDSPI is unique, blessed with a most capable staff. CDSPI was established in 1959 as a non-profit organization to serve the profession. That is the way it was back in the 50s and 60s. I often wonder if since 1974 it has been the same

Editor's Note: Occasionally we are humbled and pleased to play the role of ombudsman.

CDSPI Responds

Our broker and the Guardian Insurance Company have confirmed that breakdown of equipment due to wear and tear is not an insured peril under the Practice Interruption contract the CDA has with the Guardian Insurance Company. Needless to say, the doctors were not pleased when the adjuster spoke to them.

In their correspondence, they claim it took two and a half months to obtain a decision and I would agree with them that this length of time is much too long and does not meet the response standards for CDIP. We have discussed this matter with our broker in order to make sure such a delay is not repeated in the handling of other claims.

Cyril J. Gallant, CLU
Director of Plans and Claim Service
CDSPI, Willowdale, Ont.

especially with all the structural changes that have taken place.

The present Management Committee has been in place fifteen years. They deserve our heartfelt thanks if indeed they have exhibited the same selfless devotion to service to their fellow dentists as those who went before.

William S. MacKenzie, DDS,
1849 Yonge Street,
Toronto, Ontario

'Dentistry and War'

Can any of your readers/membership contribute to an article I am putting together on Dentistry and War, primarily as prisoners of war. I am interested in any one's personal experience as dentists providing treatment to fellow prisoners and/or unique battlefield encounters of self-care in the past 50-70 years. Any photographs of equipment or personnel would also be appreciated. Thank You.

Irene Bober-Moken, DMD
Dover, Delaware, U.S.A.

IN THAILAND

Only 34 dentists are serving 7.5 millions

Thank you for sending the back issues of the JCDA. I was particularly interested in having them in order to give them to a colleague who has just started teaching at the dental school in Phnom Penh, Cambodia. He is particularly interested in the articles in French as the dentists can all speak French though they are learning English.

The need for dentists in Cambodia is very great. There are only 34 dentists for a population of 7.5 million. Most of the equipment was destroyed by the Khmer Rouge in 1975 and has only been replaced here and there. They not only lack dentists and equipment but also supplies as the country is very poor and dentistry is not very high on their priority list. Because of the political situation in Cambodia, they have received very little aid from other countries. My colleague, Dr. Callum Durward, a New Zealand dentist, besides his teaching in the dental school, has been asked to provide simple equipment for provincial clinics and to set up a program for aiding the oral health in the countryside where there are no dentists. World Concern, a Christian relief and development organization, is supporting him and providing some of the equipment and supplies needed. They are hoping to send out more dentists and supplies as funds become available and would appreciate receiving outside help — including short term volunteer dentists. If any of your readers are interested in this project, they should contact: World Concern, Attention Cambodian Dental Project, 19303 Fremont Avenue North, Seattle, Washington 98133 U.S.A.

A note about my work. I work in a Cambodian refugee camp with 34,000 refugees on the Thai-Cambodian border. My main responsibility is to train refugee Assistant Dentists to scale, extract and fill teeth. I have 16 trainees who will probably soon be repatriated to Cambodia. I am hoping that they will be able to work in some of the district dental clinics. I found out recently that I will be moving to Phnom Penh in September in order to also teach at the dental school.

Wendell L. Sprague, DDS,
CAMA Services
28/2 Soi Pracha Utit
Pradipat Road
Bangkok 10400 Thailand



The writer, Dr. Wendell L. Sprague, is seen at a dental clinic in a refugee camp in Thailand, on the Thai-Cambodian border.

AGD not 'hostile towards specialists'

On Page 170 of the March, 1990 issue of the Journal of the Canadian Dental Association, Dr. Dennis Nimchuk is attributed with the following statement:

He indicated the most hostile anti-specialty feeling among dentists in North America is expressed by the Academy of General Dentistry, which was responsible in large part for the American Dental Association's decision in 1987 to review the status of all dental specialties."

The Academy of General Dentistry had nothing whatsoever to do with the American Dental Association's decision to review the status of all dental specialties, and in fact we have taken no position as an organization with regard to any of these reviews. The vast majority of our members have close working relationships with the specialists to whom they refer. It is a rare AGD member that outwardly expresses hostility towards specialists in general. In fact, we do much as an organization to promote harmony within the dental profession and periodically meet with one or two specialty groups each year. At the present time,



we are cooperating with the American Academy of Periodontology on their Partners in Growth program which includes the sponsorship of a series of courses given throughout the United States and Canada in periodontics.

One of our goals as an organization is to achieve better working relationships between general dentists and specialists. We don't believe that it will be possible for us to accomplish this if we are branded as being hostile towards specialists.

Warren L. Lesmeister
President, Academy of General Dentistry

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H.J. (Hyo) Maier, RDT*

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With the present state of the art so much of what makes a "quality restoration" is virtually undetectable to the human eye. Yet, even small imperfections in the impression, model or casting can lead to serious problems in fit, occlusion and marginal integrity later on.

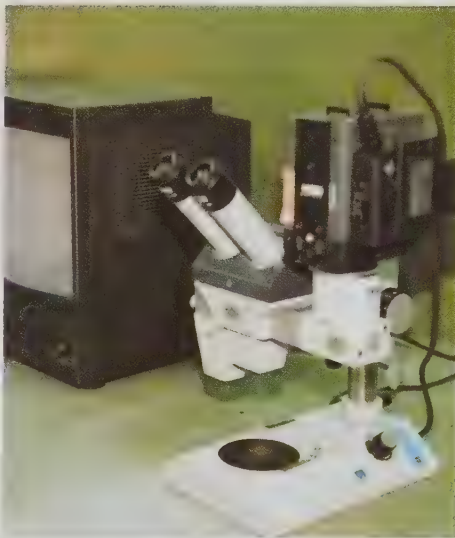
Unfortunately, while the situation was widely recognized, past attempts to remedy it were largely unsuccessful. Lenses, while magnifying the case, tended to provide a two-dimensional, distorted image. Certainly an improvement over the human eye alone but definitely not an optimal solution.

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H.J. (Hyo) Maier, RDT.



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* Mr. H.J. (Hyo) Maier, RDT, is President of Aurum Ceramic/Classic Dental Laboratories Ltd.



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INSIDE CANADA

with James Gillies

Free Trade: What Kind of Domestic Policies Do We Need to Make it Work?

It has been common practice for editorial writers and commentators to deride the large numbers of reports released recently, by both proponents and opponents of free trade, about the first year's impact on the Canadian economy of the bi-lateral trade treaty with the United States. And much of the derision has been well-placed. After all many of the tariff cuts called for in the treaty will not take effect for a number of years and it is nonsense to argue that every plant closing, or every new investment, is a consequence of the trade deal. Its effects at this stage cannot be quantitatively measured.

On the other hand the existence of the treaty has forced anyone concerned about the future of the Canadian economy to question very seriously whether the type of economic policies which the Canadian government has followed over the past few years, and is continuing to follow, are still, given the new trading arrangements, appropriate. And this is all to the good because if the policies which have been espoused for so long by all political parties in Canada are wrong for the nineties, we should already be putting in place the ones that will assure Canada a strong economic performance in the new free trade world.

It is no secret that Canada's economic policy since the 1930s has been the most Keynesian in the world — that is, emphasis has been placed almost entirely on using broad economic tools such as fiscal and monetary policy to achieve full employment and price stability.

The essence of these policies is that they focus on the overall aspects of the economy. If there is a decline in employment such policies call for a cut in taxes and an increase in government spending to put more purchasing power in the hands of consumers; conversely, if there is inflation, purchasing power is taken out by increasing taxes and reducing government spending.



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Similarly, during periods of economic decline the money supply is increased so interest rates will drop, thereby stimulating investment in plant and equipment, housing and other goods. When the economy is overheated reverse policies are used — the money supply is reduced and everything possible is done to increase interest rates.

Programs must be designed that lower production costs and make the economy more competitive.

No one, of course, can or does argue against the past goals of policy making. Everyone wants prosperity without inflation and most Canadians are supportive of programs that provide all Canadians with at least a minimum standard of living. The problem that is arising with respect of policy making for the nineties is not, therefore, one of goals — rather it is whether the policies used in the past to achieve national goals are the correct ones in the new free trade environment.

As long as Canadian business organizations producing for the domestic market operated in a relatively protected environment and exporters operated with competitive costs, the traditional fiscal and monetary policies worked well. Indeed, during the past few years the Canadian economy experienced one of the strongest rates of growth of any industrialized western country. However, general and fiscal policies, as they have operated in Canada, have resulted in the economy becoming in a general sense very high cost.

The level of prodigious spending by all levels of government over the past decades has resulted in government debt in the nation reaching astronomical levels. Instead of using tax revenues in periods of prosperity to pay down debt, as any responsible use of fiscal policy calls for, governments have continued to spend much more than they have taken in with the result that over 32 per cent of all federal tax revenue is required simply to pay the interest on the federal debt.

There are only two ways of dealing with this debt problem — and it must be dealt with. One is for governments to spend less and the other is for governments to raise more taxes. Unfortunately, government leaders in this country have not had the political will to cut expenditures and therefore they are attempting to deal with the problem through raising taxes.

Unfortunately, Canadians are already the highest taxed people in the world. Canadian producers, therefore, start with a major handicap when competing with products produced in other countries. The replacement of the manufacturers' sales tax with a general value added tax is trumpeted by the federal government as a method for resolving part of this problem by taking some of the burden of direction. However, even after all the currently proposed tax changes are in place, Canadians will remain among the highest taxed people in the world.

Because of such high taxes, the level of government services — the national health program, unemployment insurance, universal pension payments and so on — provided to Canadians is greater than that in many other countries. As a consequence of these benefits being paid by taxes one might expect that wages and salaries would be substantially lower in Canada than, say, in the United States. Unfortunately, for many industries this is not the case, so not only are Canadian producers faced with higher taxes but they also have higher wage costs. That this should be the case is not astonishing because Canadians find, in spite of the government benefits they receive, that they can only maintain their standard of living with high wages because taxes are so high. It is a cycle that is difficult to break and it all ends up with higher production costs for Canadian businesses.

Perhaps even more troublesome to producers is the impact of monetary policies on costs. For the past few years, and currently, the Governor of the Bank of Canada has believed that inflation is the most serious economic problem facing the nation. As a result he has followed a policy of keeping interest rates high — the spreads between U.S. and Canadian rates are at near record levels.

There are only two ways of dealing with this debt problem — and it must be dealt with. One is for governments to spend less and the other is for governments to raise more taxes.

This high interest rate policy has two major effects — both bad. First, it makes the cost of capital to Canadian producers high relative to the cost in other countries thereby creating another competitive disadvantage for Canadian firms. And second, it keeps the value of the Canadian dollar vis-à-vis other currencies, but particularly the American dollar, high. As a consequence, Canadian exports are more expensive than they would be if the rate were lower. Again, public policy increases the costs of Canadian producers and makes it more difficult for them to compete against producers in other countries.

So, as we come to the end of the first year of the bi-lateral trade treaty with the United States it is not particularly useful to try to assess how many jobs may have been gained or lost. No one can tell for sure. However, what is useful is the beginning of the realization that the

general broad economic policies that have been used in Canada in the past few years are not likely to be the most appropriate ones for a country that has chosen to enter into a free trade agreement with its major trading party.

The reality is that the goals of full employment and price stability in a free trade environment are most likely to be achieved through policies that stimulate efficient production rather than by indiscriminate broad monetary and fiscal policies. Programs must be designed that lower production costs and make the economy more competitive. Emphasis must be placed on cutting taxes, deregulating various industries, enforcing competition, and privatizing activities where it is clear that such action will bring efficiency. Subsidization of all sorts

should be phased out. And if there is a public policy goal of redistributing income it should be done directly, that is by grants to individuals, rather than through maintaining inefficient activities in operation.

Finding how to put such policies in place without excessive social disruption is a great challenge. Attempting to do so is certainly a much more productive use of resource and energy than trying the impossible; namely, the measuring of the impact of the free trade agreement during its first year of operation on the Canadian economy. Δ

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Dentistry for the homebound and institutionalized: The University of Manitoba's Home Dental Care Program

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Introduction

Within Canada, the majority of the elderly reside in the community, with only a small proportion of approximately 9% being homebound or living in institutions.¹ This group is usually described as being the very frail and functionally dependent elderly, who are so impaired by chronic, debilitating physical, mental and/or emotional problems that they are unable to live independently.² Because of mental handicaps or chronic illnesses, they have become confined to their own homes or to long-term care facilities, thereby isolating them from the mainstream of dentistry.

Because of the growing awareness of the need for dental care for this underserved group,³ different types of mobile treatment services have been developed.⁴⁻¹⁰ These services allow treatment to be provided outside the dental office by using various types of equipment and different management approaches. Generally, mobile dental services are based upon two basic types of delivery systems: 1) a mobile dental office which carries all equipment necessary for a complete dental operatory and allows the patient to be treated inside the unit;¹¹ and 2) an equipment carrier which transports dental equipment to the patient.¹¹ The equipment has to be taken out of the carrier and set up inside the patient's home or institution.

Aside from the different types of delivery systems, a mobile dental service can also differ considerably in the type of equipment and scope of services provided. Equipment can vary from the most basic portable set-up that can be easily transported by hand, to larger, more complex pieces of equipment that can recreate a dental operatory. The most basic portable set-ups contain: dental instruments (such as mirrors and anesthetic syringes), consumable supplies (such as anesthetic and denture reline materials), a light source (flashlight), and a variable speed lab drill. These allow the dentist to provide palliative or emergency proce-

dures such as extractions or denture adjustments. Some of the more complex portable equipment has units with compressors capable of operating high- and low-speed handpieces, air and water syringes, and an evacuation system, as well as having a portable dental chair and dental light source. This equipment provides a full range of dental services.^{4,5,12,13}

In Winnipeg, the needs of the homebound and institutionalized population are being met with a portable dental service called the Home Dental Care Program (HDCP). This program was initiated by the University of Manitoba's Faculty of Dentistry in 1985. At the present time, it is the only comprehensive mobile dental service available in Winnipeg, and possibly Manitoba, for those patients who are homebound or institutionalized.

This paper will evaluate the operation of the HDCP since its inception, looking at the program description and operation, equipment used, patient characteristics, number of patient visits, types of services provided, and operating costs. In addition, some of the problems encountered

with the program, and future goals and plans, will be discussed.

Program Description and Operation

INITIAL GOALS

The HDCP was established to meet two key goals. The first was to provide basic dental care to individuals who would be unable to attend a dental office for treatment due to a handicapping condition, or for whom physical transfer to and from a dental office posed either a medical risk or an outstanding difficulty. Patients who require extraordinary means of transportation (e.g. ambulance), or for whom the transportation process would cause undue risk or debilitation would also qualify for the in-residence care. Because there was also a need for more dental training experience in treating homebound and institutionalized individuals, the second goal of exposing undergraduate dental students and graduate dentists to this specific type of care was established, as part of an overall program of



Fig. 1. Van used in the home dental care program.

education in the dental care of the elderly and disabled.

PROMOTIONAL ACTIVITIES

Initially, the HDCP promotion was limited to the mailing of a program description brochure to all Manitoba dentists, Winnipeg nursing and personal care homes, and various social service agencies. Participation in a Senior Citizens Consumer Forum, involvement in a University of Manitoba "Universities Week" campaign, and local media coverage also helped to promote the service. Because dental service advertising in any form is prohibited under a Manitoba Dental Association bylaw, the opportunity to further promote the program is limited. Of late, continued contact with nursing and personal care home administrators has been important in maintaining an interest in the services that the HDCP can provide.

STAFFING

Currently the program is staffed by a full-time dental assistant, three part-time dentists and an overall program co-ordinator. The assistant is responsible for appointment scheduling, chairside assisting, maintaining supplies, aiding in equipment set-up and take down, billing and other administrative duties. Dentists work on a half- or full-day basis on a predetermined schedule during one of the four days per week that the van is operational. Program co-ordinator duties include program development and much of the promotional, statistical and financial aspects of the program.

Equipment Used

All treatment is rendered by transporting the necessary equipment into the patient's place of residence. A GMC van, donated by a local auto dealership, is used for equipment and personnel transportation, and for equipment storage (Fig. 1). The modern portable equipment allows a complete range of general dental services, and involves a complete operatory set-up including a chair, light, compressor and handpieces (Fig. 2). In instances where space does not permit complete operatory set-up or for reasons of operator preference, a portable headrest is also available which can easily be attached to a wheelchair (Fig. 3). Instruments and consumable supplies are transported in converted fishing tackle boxes, one each for examinations, prosthetics, restorative procedures, and oral surgery (Fig. 4).

Data Recording

A summary of activities including data on procedures accomplished, patient charac-

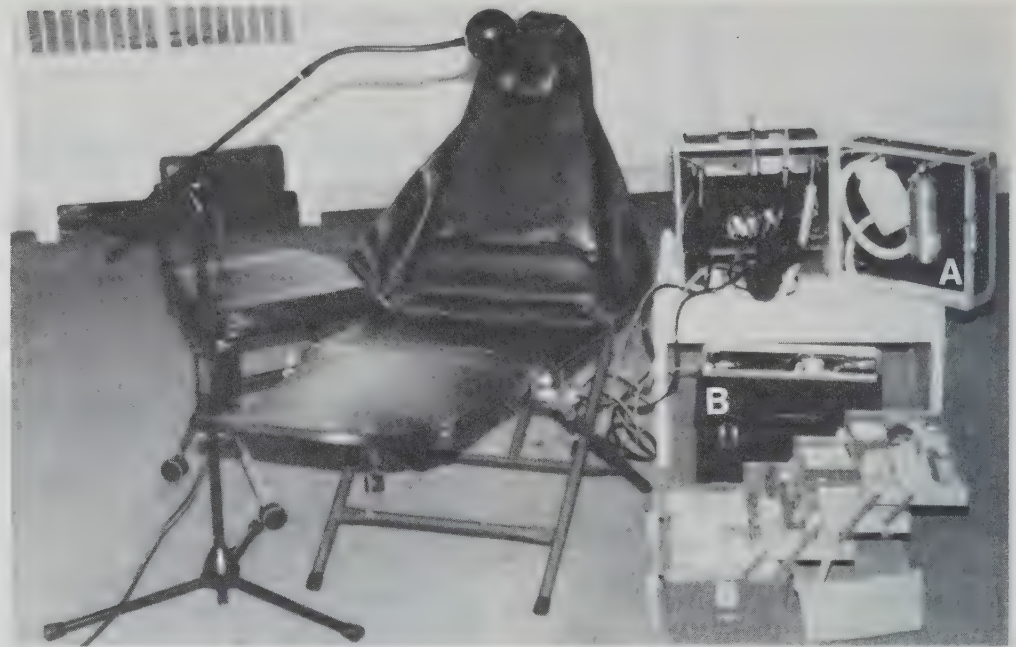


Fig. 2. Complete operatory set-up (Aseptico Co. Ltd., USA) including dental unit (A) and compressor (B).

teristics, distances travelled and operational time is completed daily. Data is recorded in the patient chart after each appointment and in daily activity logs. This information is subsequently computerized and reported monthly, and as part of an annual program activity document. Included in the data is information on the number and location of patients, type and number of treatments, and the costs and fees generated. The data from the 1986-87 fiscal year to the 1988-1989 fiscal year will be presented.

Operational Procedures

Initial contact for an appointment is made by the patient or caregiver calling the HDCP directly, with all subsequent patient



Fig. 3. Portable headrest which can be attached to a wheelchair.



Fig. 4. Plastic fishing tackle boxes used to carry instruments and consumable supplies.

visits then scheduled by the dental assistant. Usually the first visit involves an examination and treatment-planning session. At the conclusion of this visit, an estimate of the cost for the required treatment and a consent-to-treatment form are left with the patient or financially responsible person for approval. Following approval, treatment is conducted and billed when all procedures have been completed. A recall system is currently being developed, and will be in place shortly. This will be useful in improving the continuity of care for HDCP patients.

Student Education

Fourth year dental and second year dental hygiene students at the University of Manitoba are given the opportunity to participate in the HDCP during one of their external rotations. Unfortunately at the present time, student exposure is limited to only 1-2 days. Their duties are more in an observational and assisting capacity, rather than actually providing treatment. However, it is hoped that students may become more actively involved and be able to provide treatment for the homebound and institutionalized patients.

Patient characteristics

At the present time, all patients using this service reside in the metropolitan Winnipeg area. During the 1988-89 year, 21 per cent were living in private homes and 79 per cent were residing in one of the 21 personal care homes or five hospitals visited by the HDCP on a regular or semi-regular basis (Table I). The number of visits to private homes decreased markedly in 1988-89 over the previous year, while the number of visits to institutions increased by slightly more than 100 over the previous year. Nevertheless, the ratio of institutional patients compared to private home patients has remained at approximately 5:1.

Currently, there are more than 650 adult patients enrolled in the program, of which 19 per cent are new patients and 81 per cent are return patients (1988-89). This ratio of new to return patients has increased over the years, with return patients outnumbering new patients by approximately 5:1. The largest single group were those aged 75 to 84, while the smallest group were those under 65 years of age (Fig. 5). In 1987-88, there was an increase in the under 60 age group, primarily due to services provided in one inner-city community health clinic which was not visited in 1986-87. Overall, those aged 75 and over utilize the HDCP at a rate 75 per cent higher than all other groups combined.

PATIENT BREAKDOWN BY AGE

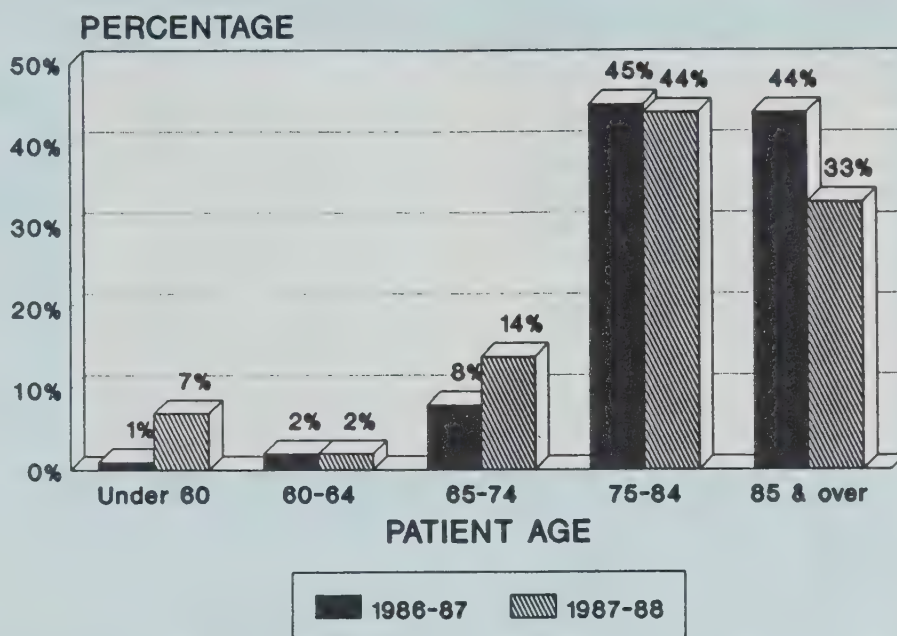


Figure 5

PATIENT REFERRALS (1986-87)

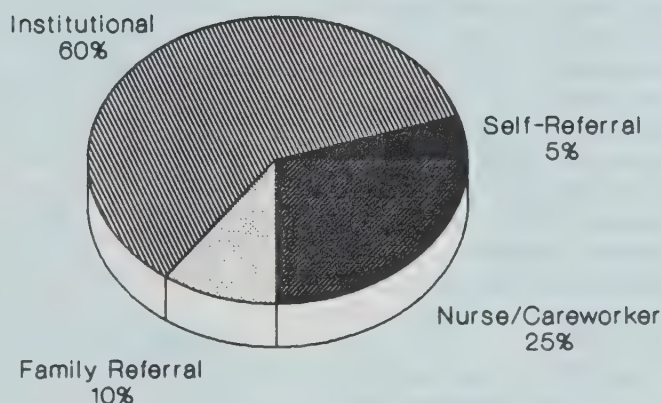


Figure 6

From an economic standpoint, the population served are generally self-financing, whether in private homes or institutions. Only a small percentage (less than 5 per cent) receive social allowance income. Overall, the patients served are able to afford dental care, although some have their children or the public trustee manage their finances. To date, the HDCP has had no problem with unpaid accounts.

Patient visits

There were 949 patient visits for 1988-89 (Table II), representing a decrease from the previous two years of operation (1,043 in 1987-88 and 1,016 in 1986-

87). Since the largest portion of services are prosthetic, the greater number of visits required to complete these procedures is reflected in the total number of visits. However, treatment completions increased in 1988-89, indicating that more of the services are being completed. This may have an impact on the overall number of patient visits as it decreases the number of patients available for return visits.

The number of patient visits related to the number of dentist-days, and the number of visits per dentist-day for each year are shown in Table II. A dentist-day is defined as any working day on which

an individual dentist treats at least one patient.⁹ On one day, more than one dentist may be involved in the program, but this day still comprises only one dentist-day. By using dentist-days, the efficiency of the program can be measured as more dentist-days involve more time spent in travel and in setting up equipment at different locations. The HDCP has had no decrease in the number of dentist-days for the past two years, illustrating a steady demand for dental services.

Types of services provided

All aspects of basic dental care, such as restorative, minor oral surgery, prosthetics and preventive services, are provided. A list of the services provided for the 1987-88 and 1988-89 periods is shown in **Table III**, illustrating that a variety of treatments are being provided and that the program is very service oriented. In 1988-89, despite the decline in the number of examinations and prosthetic procedures compared to 1987-88, more restorations were placed, extractions performed, and scaling and prophylaxis procedures completed. Therefore, the actual amount of treatment for 1988-89 did not decrease.

A better balance of services for the 1988-89 year is also evident when the basic services for each year of operation are compared (**Fig. 7**). During the first two years of operation, the breakdown for services remained very consistent, with examinations and prosthetic procedures being the most frequent. However, this changed in 1988-89 with more restorative and preventive services being provided, although the highest number of services remained prosthetic in nature.

Operation costs

Initially, as with the opening of any new dental practice, capital expenses exceed those of revenues generated. This has also been the experience with the HDCP. The program was fortunate in that some of the initial expenses for equipment were offset by grant funding from the President's Committee on University Outreach at the University of Manitoba, and by the Winnipeg Foundation. In addition, the van was donated by a local auto dealership, thereby eliminating the need to raise capital for this purchase. However, due to the specialized nature of the dental equipment and the cost of acquiring this equipment, the initial capital costs were still high.

To offset capital and operating expenses, treatment is provided on a fee-for-service basis, with charges based on the Manitoba Dental Association (MDA) fee

TABLE I

Patient characteristics for location of treatment new vs. return patients and total patient visits from 1986-87 to 1988-89

	1986-87*	1987-88	1988-89	TOTAL
1) LOCATION OF TREATMENT				
Institution	381 (81%)	636 (61%)	748 (79%)	1,765 (71%)
Private Home	87 (19%)	407 (39%)	201 (21%)	695 (29%)
Ratio Private: Institution	1:4.5	1:1.6	1:3.7	1:2.5
2) NEW VS. RETURN				
New	1,016	239 (23%)	185 (19%)	1,440 (48%)
Return	**	804 (77%)	764 (81%)	1,568 (52%)
Ratio New: Return		1:3.4	1:5.1	1:1.1
3) TOTAL PATIENTS VISITS				
	1,016	1,043	949	3,008

* — Data incomplete for this year (based on April-December 1986 stats only).

** — There are no return patients because this was the first year of operation.

TABLE II

Number of patient visits, patients completed, dentist-days, and visits per dentist-day from 1986-87 to 1988-89

	1986-87*	1987-88	1988-89	TOTAL
Patient visits	1,016	1,043	949	3,008
Patients completed	—	100	128	228
Dentist-days	125**	181	181	487
Visits per dentist-day	5.9**	5.8	5.2	5.6

* — Data incomplete.

** — Based upon the period from April to December 1986.

TABLE III

Description of services and total services provided from 1987-88 to 1988-89*

SERVICE	1987-88	1988-89	TOTAL
Examination	317	220	597
Prophy	1	1	2
Scale/Prophy	37	116	153
Fluoride	1	1	2
Resin	53	102	155
Amalgam	37	56	93
Caries Control	29	7	36
Crown	2	1	3
Extraction	143	173	316
Impression	110	101	211
Try-in	32	30	62
Prosthesis Delivery	164	146	310
Denture Adjustment	186	146	332
Total	1,112	1,100	2,212

* — Specific data for 1986-87 not available.

guide. A house call fee of around \$35.00 (1988-89), is levied for the initial visit, in addition to the normal examination fee. For each subsequent visit, a \$10.00

(1988-89) house call fee is charged, along with the treatment fee for the service provided.

The average cost to the patient per visit

can vary considerably, depending upon the type of treatment provided. It would, therefore, be more relevant to discuss a range of costs, rather than a specific average. The costs per visit can vary from \$50 for an examination and house call, to over \$1000 for the fabrication of new complete maxillary and mandibular dentures. A denture fee would include a \$10 house call fee for each denture fabrication step. In most instances, the patient or a family member has been responsible for payment, while around 4 per cent have involved a third party.

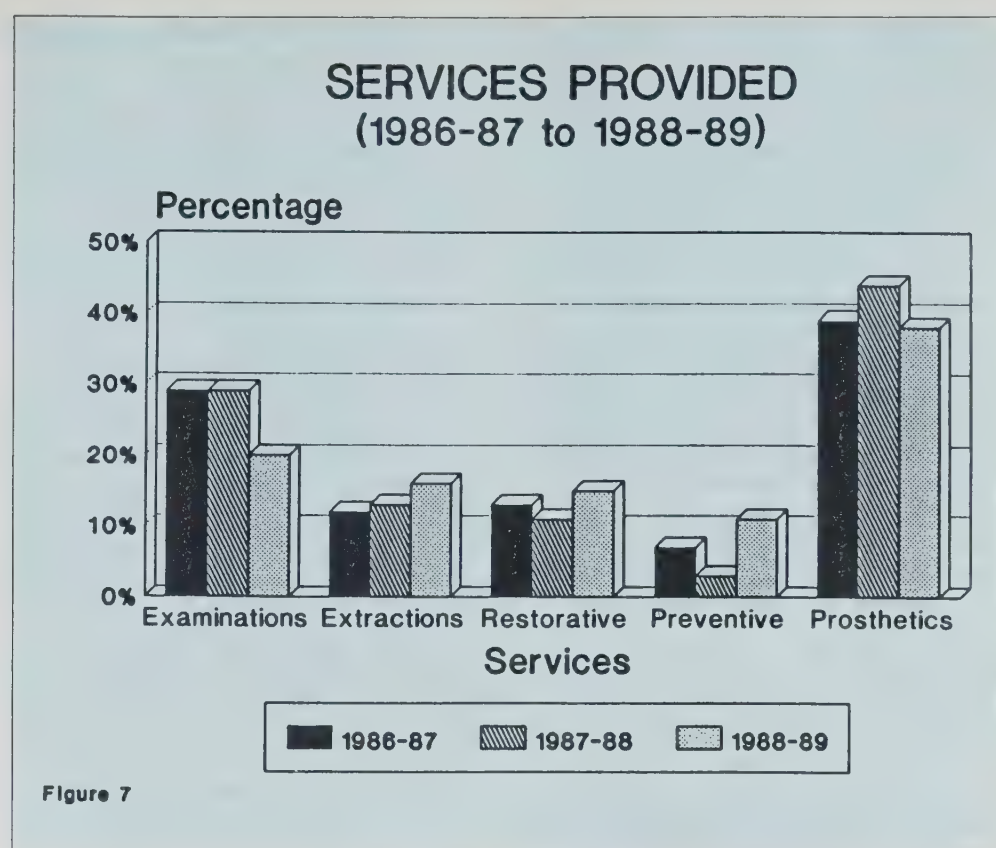
Revenues generated by the HDCP have shown a steady increase during the three years of operation. In the beginning, the initial examination was free and there was no charge for the house call. However, this changed in the 1988-89 year when the MDA examination fee was used and the house call fee structure was adopted. As a result, revenues have increased and prospects for the future are very promising. Revenue increases are very likely because the HDCP is experiencing an increased demand for its services (based upon incomplete data for 1989-90) and because a more stable recall patient base is being developed.

Discussion

Patient Characteristics and Visits

The HDCP offers the opportunity to provide out-of-office treatment to patients with mobility problems. Although the original goal of the program was to administer dental care to both the elderly and the disabled in Winnipeg, the demand has been mostly from the elderly population, especially those 75 years of age and older. Within the population serviced, the greatest demand for care has come from those elderly individuals residing in long-term care institutions. This demand increased in 1988-89 compared to the previous years, partly due to the increased number of personal care homes using the HDCP (19 in 1987-88 compared to 21 in 1988-89). In contrast, there has been a marked decrease in the number of private home visits. One possible reason is that some of the previous private home patients may have since become institutionalized, and are now using the HDCP in a different venue. Decreases in the number of private home patients may also relate a decrease in the number of referrals from visiting nurses or homecare workers. The reason for this decrease in referrals is undetermined at this time.

The program saw an overall decrease in the number of new and return patients in 1988-89. Several factors may be involved in this trend. Because the MDA bylaw



does not permit advertising of dental services, the amount of exposure the program receives is limited. The impact of this advertising restriction most likely affects those individuals residing in private homes because they show the lowest utilization rate, the lowest inquiry/referral rate, and are probably the least aware of the program's existence. The decrease in return patient numbers can be attributed in part to the greater number of patient completions seen in 1988-89 as compared to previous years. This is especially significant since the program did not have a structured recall program in place in 1988-89. Patient completions without these patients being followed-up with a recall visit will have an influence on some of the decreases in the pool of returning patients. Another potential reason for a decrease in the number of returning patients was that in 1988-89 an examination house-call fee structure was adopted, which may have caused some patients to withdraw from the HDCP because they could no longer afford the service. Also, to a lesser extent, patient deaths may have had some impact on the reduction in return patients; however the full impact of this cannot be accurately determined.

Despite the biggest referral base coming from the institutional setting, there are still no resident screening or structured health promotion programs in place in any of the personal care homes visited. The lack of such programs quite possibly

has an impact on the number of institutional residents being seen, with the initiation of these programs having the potential to increase the utilization rate substantially. Plans are being considered for the introduction of in-service training sessions for nursing home personnel, and the initiation of oral health screenings for nursing home residents. In addition, utilization rates could be potentially increased by targeting those homebound individuals under the age of 60 years who are under-utilizers of the program, and who may consequently not be receiving the dental treatment that they require.

The number of patient visits per dentist-day can be considered rather low in comparison to the numbers seen in private practice. This, however, must be related to the distances that one must travel to get to the patients. Private home visits take more time to complete because only one patient is seen in each location. In addition, extra time is required for a private home visit to accommodate equipment set-up and take-down. These factors decrease the time available to actually carry out patient treatment. For institutional settings, the potential exists to see more than one resident per visit, thereby making the initial equipment set-up more productive. However this is not true in every case, since sometimes only one resident is seen or time is spent providing other non-treatment services, such as staff education or administrative duties.

In 1988-89, the HDCP experienced a decrease in the number of patient visits when compared to the previous years of operation. With an increase in the number of treatments being completed in 1988-89 without these patients seen on recall, there was a direct decrease in patient visits. Another factor relating to the lower number of patient visits is that there were fewer denture adjustment visits conducted in 1988-89 as compared to 1987-88. For 1988-89, there was, on average, one denture adjustment visit per prosthesis delivery, compared to an additional 40 adjustment visits required for all the prosthesis deliveries in 1987-88. There were also 18 more prostheses delivered in 1987-88, requiring a greater number of adjustments, all of which contribute to the total number of patient visits.

Treatment Services

Despite fewer patient visits in 1988-89, a greater balance of treatment services was being provided as compared to the previous years. Fewer examinations were completed in 1988-89, which is directly related to the fewer number of patients seen overall. However, the number of preventive services, restorations, and extractions did increase, as would be expected in any growing dental practice. This increase in preventive procedures is probably attributed to several factors. One reason was a greater proportion of return patients seen in 1988-89 than in any previous year. In addition, the greater number of dentate patients increased the demand for preventive procedures. Also, the dentists involved may place a greater emphasis on preventive dentistry than those who have previously been involved in the program. Although the number of fluoride treatments does not necessarily reflect the interest in preventive dentistry, the provision of fluoride, especially when placed on individual teeth, is not usually charged for and therefore not recorded on the log sheets. The recording of all fluoride applications would be worthwhile to document, as would the number and frequency of oral hygiene instruction sessions given to patients, family and nursing staff. At the present time, even though the dentists spend time in these activities, it is never logged in the records. Perhaps information on oral hygiene instruction could be recorded as the number of hours spent providing community service.

There was a sharp increase in the number of restorative procedures, especially resins, for 1988-89. The marked rise in resin restorations partly relates to the

increased usage of glass ionomer cements. Perhaps glass ionomer restorations should be recorded separately. A slight increase in the number of amalgams can be compared somewhat to the decreased usage of caries control restorations, and some may be replacing existing caries controls. However, the decrease in the number of caries controls could relate to the dentists' preference for placing more permanent restorations.

A high number of extractions were completed in this program, partly due to the inability to provide endodontic therapy. A small part of this results from the inability to safely operate a portable x-ray unit in a private home or institutional setting without unnecessary radiation scatter and exposure. The possibility of mounting the x-ray unit inside the van and transporting patients outside for radiographs was explored, but was found impractical. Should the need arise where radiographs are required, a referral to a local private practitioner or to a hospital-based dental clinic could be arranged. More importantly, the need to provide endodontic therapy and to take the patient out of the home or institution for treatment, must be weighed against the additional stress the move may produce and the added financial burden for treatment. In addition, many of the teeth that are removed are very periodontally involved so that extraction is the only treatment option, and many of the patients are so severely medically compromised that endodontic therapy is not possible.

Despite the number of impressions and try-ins remaining similar in 1988-89 to the 1987-88 levels, there were fewer prostheses supplied. This may relate to a higher number of chairside prosthetic procedures, such as relines and repairs, in 1987-88. There was also a lower frequency of denture adjustments in both the overall number and as a ratio to the number of prostheses delivered. Possible reasons for this are two-fold: better prostheses delivery management by the dentists or, the more likely reason, a greater number of simple procedures, such as clasp or tooth additions. These procedures generally require few, if any, visits for adjustment.

Future goals, objectives and observations

In the future, the program can anticipate an increased demand for services as the number of older persons increases, especially for those residing in long-term care facilities. In fact, incomplete data for 1989-90 already indicate an increased

demand for the services of this program, with the newly adopted recall system influencing the number of return patient visits. The HDCP will have to initiate a comprehensive patient screening, dental treatment provision and caregiver education program, especially for long-term care facilities. An increased demand for preventive and restorative services is also anticipated as the older population retains more teeth, with a proportionate drop in the number of prosthetic services being provided. Overall, the demand on the HDCP to provide dental services to the homebound and institutionalized will continue.

The feasibility of private dentists or university dental faculties developing such a program should be considered, as other Canadian cities are experiencing an increase in the number of elderly. With this increase, there will also be a large number of individuals in nursing homes or who are homebound, who unfortunately are under-served by the dental profession. Those dentists residing in smaller communities could also consider establishing such a program, and they could service nursing homes in several communities within a certain mileage radius of their home base. This would increase the demand and utilization of their HDCP-like program and would justify the costs involved in establishing such a service. Thus far, programs such as this have been under-developed in Canada. Knowing that Canada has the highest institutionalization rate in the Western world,¹ it would seem likely that there is great potential for establishing similar programs in other areas of the country.

Conclusions

Demographic changes have resulted in a substantial increase in the number and proportion of aged in the Canadian population. This trend is continuing. Both epidemiological changes (i.e. the decreasing number of edentate aged) combined with the demographic changes, have resulted in the emergence of the aged as an important underserved population. In addition, the handicapped portion of the population has also been growing, if somewhat more slowly.

Since a substantial portion of this population is homebound or institutionalized, it has been largely outside the conventional care delivery system. The HDCP provides one of a number of possible models for delivery of care to this underserved population. This analysis of data on three years of operation provides the first serious look at the population served, services delivered, and changing

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Disasters Big and Small

Robert B.J. Dorion, BSc, DDS, Diplomate ABFO^{1,2}

ABSTRACT

The history, methods, problems, errors, statistics and misidentification of disaster management in forensic dentistry are discussed.

SOMMAIRE

Voici un article portant sur la dentisterie judiciaire, son histoire, ses méthodes, ses problèmes, ses erreurs, ses statistiques et ses problèmes d'identification dans les cas de désastre.

Introduction

The dictionary defines a disaster as a calamitous event, especially one occurring suddenly and causing great damage or hardship. Disasters may or may not result in the loss of life. Disasters may be classified as follows:

Natural disasters result from earthquakes, tidal waves, volcanic eruptions, tornados, hurricanes, mud slides, avalanches, cave-ins, epidemics and similar events.

Man-made disasters can be classified as accidental or intentional. They result from the use of vehicles in the transportation industry: cars, buses, boats, trains, planes, space vehicles, etc. They can also result from the use of machines, structures or manufactured substances including chemicals, bacteriologic and virologic substances, explosives, armaments, etc. Examples of such disasters include the Bhopal, India, chemical accident and the Chernobyl Atomic Nuclear plant accident. The cause of an accidental disaster is either human error or mechanical defect or both. Intentional man-made disasters include such occurrences as the mass murder of students at the University of Montréal in December of 1989 and the St. Basile-le-Grand PCB fire in August of 1988.

Forensic dentistry plays an important role in the legal and social issues that arise from natural and man-made dis-



Dr. Robert B.J. Dorion

asters when death occurs. The legal issues include:

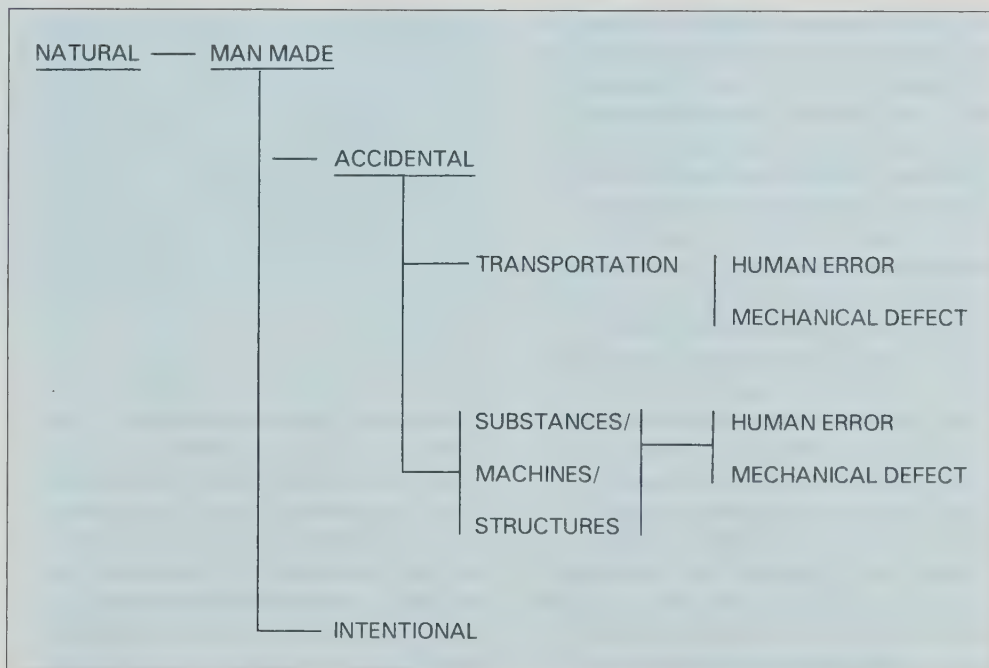
- a) issuance of a death certificate,
- b) settlement of estate,
- c) settlement of taxes,
- d) settlement of contractual obligations,
- e) establishing the civil status, etc.

The social contribution of forensic investigation is often overlooked. It includes:

- a) The state of preparedness: organizing, educating, equipping and maintaining a team of forensic experts who can respond to the problems arising from a disaster situation,
- b) identification of cadavers and comforting the next of kin,
- c) helping law enforcement personnel, governments and other organizations who have an interest (vested or not) in the results of forensic investigation, and
- d) contributing to the judicial process.

History

In 1897 Dr. Oscar Amoedo delivered a paper entitled "The Role of the Dentist in the Identification of the Victims of the Catastrophe of the Bazar de la Charité in Paris, 4 May 1897" at the International Medical Congress in Moscow. At a social event in Paris, 126 of those who attended perished as a result of a fire. Amoedo, a Cuban professor at a dental school in Paris, identified many of the victims by dental means.¹ The following year he wrote the first treatise in forensic odontology. Today he is rightfully acknowledged as the father of modern forensic dental practice. The same disaster is referenced in a book entitled "Précis de Médecine Légale" written by the French physician V. Balthazard in 1921. In this publication the basis of a forensic dental



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protocol is formulated. It states that basic procedure should include the following:

1. the examination and recording of dental characteristics of the deceased by a physician or dentist, and
2. the comparison of such findings to *written* antemortem records.

On September 17, 1949 the S.S. Noronic, on a cruise from Detroit to the Thousand Islands, burned in Toronto harbour, claiming the lives of 118 of its 700 passengers. Dr. Edmond A. Grant, Director of Dentistry for the City of Toronto, organized a dental identification team. He was assisted by Drs. A. White, W.K. Prendergast, H. Sheppard and a team of forty-one dentists. At the end of the fourth month only three victims remained unidentified. An article published in this Journal in 1952 describes the results of the investigation.² It includes a nine point protocol for disaster management in forensic dentistry. This protocol was subsequently adopted and is universally used today. It recommends:

1. Labelling of all specimens as to the grid area recovered and an assigned morgue number,
2. Radiography of all dental specimens,
3. Photography of all dental specimens,
4. Charting of all dental specimens,
5. Odontograms,
6. Storage of all specimens for further referrals and research,
7. Storage and retrieval methods,
8. Working as a team in pairs,
9. Use of elimination charts.

Methods

Although each disaster is unique and requires an individual logistical approach there are, nevertheless, problems and solutions common to all. Remains recovered from plane crashes may be mutilated, fragmented, commingled, burned and carbonized. When an air disaster occurs in subfreezing temperatures as with the December 1985 Gander, Newfoundland, crash, it presents an entirely different set of problems from the mass murder-suicide disaster that took place in the heat and humidity of Jonestown, Guyana in 1978. The latter involved the deaths of 913 persons. Not only do climatic and environmental conditions differ but access to the site, recovery of the bodies, the state of the corpses (decomposition and preservation problems), morgue facilities, personnel management, equipment and communications availability, all pose differing problems. Many of these factors cannot be foreseen. For example, the last bodies in the Gander crash were not recovered until nearly two months later, because of climatic



(PHOTO BY LYNN BALL, COURTESY THE CITIZEN, OTTAWA, CANADA)

Canada's largest air disaster, at Gander, Newfoundland, December 12, 1985, claimed 256 victims. They were United States Armed Forces personnel returning from tours of duty in the Middle East.

POSTMORTEM	Natural dentition
	Synthetic dentition
they are compared to:	Foreign bodies ⁴
	Anomalies
	Bone trabecular patterns
	Sinus patterns
	Rugae prints ⁵
	Lip prints
	Entire skull ⁶
	DNA
ANTEMORTEM	Dental and/or medical x-rays of the skull:
	Natural dentition
	Synthetic dentition
	Bone trabecular and sinus patterns
	Anomalies
	Casts, models and impressions ³²
	Old dentures, orthodontic appliances, mouth guards, night guards, other oral appliances ⁷⁻¹⁴
	Written records
	Lip prints
	"Toothy smile" photographs ¹⁵
	Oral cellular components and/or blood

conditions.³⁵

The most publicized role of dental identification is that associated with air disasters. Identifying the flight crew serves two important purposes: a) it establishes their location at the time of impact and, b) permits analysis for drug use. Establishing the whereabouts of pilot, co-pilot and navigator can answer one extremely important question: Were the flight crew members in their respective seats? If so,

what happened? Had one or more been shot, succumbed to gases, had a heart attack? Had someone been under the influence of alcohol or drugs?

Locating and positively identifying crew and passengers can also provide investigators with clues as to the cause of the accident. A mid-air explosion due to an incendiary device would result in different physical effects on victims, equipment and cargo than those caused by an impact

into a mountain. Since most persons remain in their assigned seats, one can reconstruct events from the position and distribution of the bodies. Additionally, the distribution of bodies, and the types and location of traumatic injury patterns on the victims can be instrumental in redesigning future aircraft.

The methods used in dental identification are relatively simple. They involve comparing known and identifiable antemortem material to postmortem material.³ The means utilized include one or more of the following:

Identification may fall into one of several categories:

1. *positive*: the antemortem and post-mortem data match in sufficient detail quantitatively and qualitatively to establish that they are from the same individual. All changes that have taken place during the course of treatment are to be taken into account. In addition, there are no irreconcilable discrepancies.
2. *probable*: the antemortem and post-mortem data have consistent features, but due either to the condition of the remains or the quality of the antemortem evidence, it is not possible to positively establish dental identification.
3. *possible*: the difference between probable and possible is a question of degree, the former being stronger.
4. *insufficient evidence*: the available information is insufficient to form the basis for a conclusion.
5. *elimination*: the antemortem and postmortem data are clearly inconsistent.

In airline disasters there is the advantage of having a flight manifest which lists persons allegedly aboard the plane. In this circumstance there is *presumptive* identification which must be confirmed. It is usually easier to get antemortem records in this instance, if they exist, than it would be in a case where there is no presumptive identification.

In both the Beirut terrorist explosion that killed US military personnel at the American Army base in 1983 and the Gander, Newfoundland air crash in 1985 one important recommendation emerged from a disaster management point of view. All American duty personnel of the US Armed Forces are henceforth required to have a duplicate panorex stored at a central repository in the United States. In the former case, the antemortem records were stored close to the centre of the explosion. In the latter, they were in the possession of the personnel on the plane.

There is one category of identification which is referred to as *exclusion*. Identification by exclusion is a viable method under certain circumstances, but extreme caution is in order since this form of identification does not rely on dental expertise. An example would be a plane crash with three known persons aboard, two of whom have been positively identified and a third presumptive person unidentified with unrecoverable antemortem dental records. A forensic dentist is not mandated to form an opinion on the third victim since dental expertise is not possible. It is the role of the coroner or the medical examiner to arrive at a conclusion as to the identity of the third person based upon his complete investigation. One has to keep in mind, however, the possibility of intentional substitution of a body for the alleged victim or that another party could have taken the place of the third person at the last minute as so often happens in commercial airline travel. Failure to take these factors into consideration could result in a false identification.

Problems and Errors

Site Management

One of the greatest sources of confusion derives from problems of site mismanagement. The forensic dentist does not control access to the site although he may be asked to participate in the recovery of human remains. The entire process of recovery, tagging and identification of specimens should be under strict control. No identifying features such as "dog tags", jewellery, glasses, watches, clothing or other personal effects should be removed from a corpse without proper identification as to source. Since chain of possession begins at the crash site, the cadaver and all personal effects should be registered and should carry tags wherever they go. Secondly, a quadrant or sector number should be given to each corpse (i.e. where the remains or parts thereof were found at the crash site). Personal effects should not be separated from a body before arriving at the morgue facility.¹⁶

Problems can arise from the shipping of cadavers to another jurisdiction for forensic investigation. They include:

- a) legal and political issues.
- b) loss of control of the investigation.
- c) switching of cadavers.
- d) additional costs of transportation and personnel.
- e) potential for causing additional post mortem trauma to the cadavers which may be wrongfully attributed to the disaster.
- f) lost time.

- g) demoralizing effect on forensic investigators in the country of origin.
- h) additional psychological trauma for the relatives of the victims.

Morgue Management

A common source of potential error is in the mismanagement of the morgue site. This is particularly critical if the morgue site is a temporary facility. The personnel responsible for the morgue should be experienced and have complete control of the facility. The inadvertent "switching" of cadavers (placing the cadaver on an incorrect gurney, for example) is a serious problem and can have catastrophic legal repercussions. Extra precautions should be exercised if using multilevel gurneys.

Personnel Management

Qualifications

Chain of command

Numbers

The need to identify forensic scientists unequivocally qualified to provide essential professional services for the nation's judicial and executive branches of government has long been recognized in both the United States and in Canada. In response to this professional mandate, the American Board of Forensic Odontology was organized and incorporated in 1976 to provide, in the interest of the public and the advancement of the science, a program of certification in forensic odontology. In purpose, function and organization the board is analogous to the certifying boards in various medical specialties and other forensic disciplines. The objective of the board is to establish, enhance and revise, as necessary, standards of qualification for those who practise forensic odontology and to certify as qualified specialists those voluntary applicants who comply with the requirements of the board. The requirements are stringent. In this way, the board aims to make available a practical and equitable system for readily identifying those persons professing to be specialists in forensic odontology who possess the requisite qualifications and competence. Certification is based upon the candidate's personal and professional record of education, knowledge, training, experience and achievement in forensic dentistry as well as the results of a two-day formal oral and written examination. There are currently three board certified forensic dentists in Canada: Dr. Laurence Cheevers of Vancouver, B.C., Dr. John William Blair of Calgary and this author. There are 89 board certified forensic dentists in the United States. The American Academy

of Forensic Sciences is a sponsor of the board.

A board certified forensic dentist should, whenever possible, direct the dental team and the identification process. Additionally, he should address any problems related to his field of expertise. This includes communications between dentists, administration and public relations.

The members of the team can include dentists, dental hygienists and technicians such as x-ray personnel who have had some prior formal training and preferably prior experience in disaster management. Working in groups of two dentists or one dentist and one auxiliary for each task appropriated, is suggested. Each pair restricts itself to a designated area and is responsible for a specific task. For example, while one person examines the oral cavity, the other records and repeats observations. Designated tasks include oral examination, dental photography, dental radiography, etc.^{16,17}

The use of untrained personnel, understaffing or overstaffing can lead to devastating results. In the Delta Air crash at Dallas-Fort Worth on August 2, 1985, dental charting was performed by pathologists before activation of the dental team. This necessitated the re-examination of victims. Some charts were found to be erroneous, others incomplete. A second problem relating to unqualified personnel is the problem of dental terminology, signs, symbols and in particular the various tooth numbering systems used throughout the world. This is particularly important when the victims of a crash come from different countries. In the New Orleans crash of 1982, 154 victims came from 15 different countries and one dental record contained nine different types of dental charting.¹⁸ What would appear to be dental discrepancies can at times be explained by misinterpretation of the dental nomenclature.

How many dentists should comprise the dental team? In the San Diego crash of 1978 in which a PSA jet and a Cessna collided in mid-air, there were 144 deaths (135 in the jet, two in the Cessna and seven on the ground). Twenty-five bodies were processed per day by three teams of two dentists, each team being assigned a different task. It took four days to identify 100 victims (92 per cent) by dental means.¹⁹ This is an ideal situation. Morlang suggests that the staffing should depend upon the number of victims of the crash. He suggests figures for various circumstances.²⁰

TABLE I

Worst Fatal Air Disasters 1971-1988

Location/State	Date	Fatalities
1 Japan	71/07/30	162
2 Moscow/USSR	72/10/13	174
3 Tenerife/Spain	72/12/03	155
4 Bousquet de Dammar/France	74/03/03	346
5 Colombo/Sri Lanka	74/12/04	191
6 Imzezem Immouzer/Morocco	75/08/03	188
7 Isparta/Turkey	76/09/19	154
8 Tenerife/Spain	77/03/27	248
9 Tenerife/Spain	77/03/27	335
9 Bombay sea/India	78/01/01	213
10 Colombo/Sri Lanka	78/11/15	183
11 Chicago/US	79/05/25	271
12 Jeddah/Saudi Arabia	79/11/26	156
13 Ross Island/New Zealand	79/11/28	257
14 Alma-Ata/USSR	80/07/07	163
15 Riyadh/Saudi Arabia	80/08/19	301
16 Ajaccio/France	81/12/01	180
17 Atlantic Ocean/Ireland	85/06/23	329
18 Dallas-Fort Worth/US	85/08/02	163
19 Gunma/Japan	85/08/12	524
20 Gander, Newf./Canada	85/12/12	256
21 Maravatiomich/Mexico	86/03/31	167
22 Piaseczno Laski/Poland	87/05/09	182
23 Romulus MI/USA	87/08/16	157
24 Mauritius/Indian Ocean	87/11/28	159
25 Persian Gulf/Iran	88/07/03	280
26 Lockerbie/Scotland	88/12/21	270
TOTAL [33]		6164

TABLE II

Authors	No. Victims	Dental	ID	Dental + Others	
Teare 1951	28	3	11%		
Honolulu 1962	27	14	52%		
Haines 1967	72	34	47%	6	8%
Keiser-Nielsen 1963	42	10	24%	18	43%
Keiser-Nielsen 1963	101	0	0%	45	45%
Salley 1963	127	62	49%		
Fisher 1963	81	3	4%	13	16%
Blair 1964	23	3	13%	10	43%
Stevens and Tarlton 1966	218	21	10%		
Harmeling et al. 1966	57	43	75%		
Haines 1967	72	34	47%	6	8%
Boone County, Ky 1967	67	19	28%		
Van Wyk 1969	123	6	5%	25	20%
Peterson and Kogon 1971	109	53	49%		
Ashley 1972	162	70	43%		
Ashley 1972	64	10	16%		
Waalder 1972	24	6	25%	9	38%
Luntz and Luntz 1972	28	25	89%		
Beckmann 1974	148	59	40%	63	43%
TOTAL	1573	475	30%	195	12%

Psychology

Prolonged contact with large numbers of corpses can lead to psychological problems for identification personnel, even if forensic pathology or dentistry is one's chosen career. For those with little or no experience in such situations, greater stress and psychological trauma can be

anticipated. Following the Beirut terrorist explosion at the American Army base in 1983, the bodies were flown to Rhein Main Air Force in West Germany for identification. Positive identification of 239 victims was achieved by dental features and fingerprints. One important recommendation emerged from a disaster

management point of view. A clinical psychologist was to accompany the disaster team for consultation and support because the personnel developed psychological problems.

Table I lists the worst civil aviation crashes between 1971 and 1988. The largest disaster was the collision of two airplanes in Tenerife on March 27, 1977, which took the lives of 583 people. The largest single air disaster took place in Japan on August 12, 1985, when 524 died when a modified jumbo jet slammed into a mountain. Canada's largest air disaster was in Gander, Newfoundland on December 12, 1985, with 256 victims.

Table II lists the findings of 13 investigators of fatal crashes between the years 1951 and 1972 as reported by Sopher,²¹ Muhlemann et al.²² reports on the findings of an additional four investigators of fatal crashes between the years 1963 and 1974.

The total number of victims in these accidents was 1573. There were 475 (30 per cent) positively identified exclusively by dental means and an additional 195 (12 per cent) by use of dental evidence in conjunction with other observations, data and information as part of the identification process.

Table III lists the findings of 10 major disasters: eight are airline, one shipping and a tenth, mass-murder suicide.

Statistics

The forensic dentist has little or no control over many of the factors in the identification process. It is important therefore to realize that statistical information pertaining to positive dental identification should be taken in context. Positive dental identification can only result if antemortem records are available and compared to postmortem evidence and the two are found to be congruent. With this in mind, there are a number of factors that can influence that statistical picture:

- 1) *Quantity and quality of information for each antemortem record:* statistical information does not take into consideration the quantity and quality of the antemortem information available. One good x-ray is worth a thousand words. Conversely, poor records or x-rays are of limited value.
- 2) *Number of antemortem records:* the greater the number of antemortem records, the greater the potential for identification of all victims. The converse is true. In the Air Canada Woodridge disaster identification by dental means was made for 53 of the 109 victims (49 per cent). Given that

TABLE III

Location/State	Date	Airline	Deaths	Dental	Dental +
1 SS Noronic ⁸	49/09/17		118	20 20%	
2 Woodridge/Ont	70/07/05	Air Canada	109	53 49%	
3 Miami/USA	72/12/29	Eastern	101		
4 Pago Pago	74/01/31	Pan Am	96	51 57% ⁶	
5 Canary Island	77/03/27	Pan Am-KLM	326 ⁴	156 48%	31 9%
6 San Diego/USA	78/09/15	PSA	144 ³	110 76%	
7 New Orleans	82/07/09	Pan Am	154	93 60%	23 15%
8 Dallas	85/08/02	Delta	130	88 68%	6 5%
9 Gander/Newf.	85/12/12	Arrow Air	256	174 68%	
10 Jonestown/ Guyana	78/11	⁵	913	226 25%	
TOTAL			2347		

Personnel ¹	Time ²	Computer	Reference	Hours ⁷
1 40	4 months	no	[2]	
2 12	16 days	yes	[23]	492
3	60 hrs	no	[34]	60
4 13 ⁶	5 weeks	no	[24]	230
5 30	6 weeks	no	[20,25,26]	4872 ¹⁰
6 30	4 days	yes	[19,27]	220
7 30	2 months	no	[18,28]	
8 7	1 week	no	[18,28]	
9 39 ⁹	6 weeks	yes	[25,25,26]	6340 ¹⁰
10 100	7 weeks	yes	[20,25,26]	

Legend for Table III

¹ dental personnel.

² total time spent on dental identification.

³ 135 died in jet, two in Cessna, seven on ground; six persons did the majority of the forensic dental work; up to 30 were involved in one form or another.

⁴ 583 people died and 69 survived. 326 Americans on Pan Am were flown to Dover Air Force base for identification. 20 full time dentists for two weeks seven days per week for twelve hours per day; plus five dentists for additional two weeks and four for two weeks Total time 4872 hours.

⁵ mass murder-suicide; 666 victims were positively identified: 226 by dental means and 592 by fingerprints on passports.

⁶ Six dentists, one hygienist, six dental assistants. Six days of intensive work and four additional weeks of continued investigation. Only 90 of the victims were returned for autopsy.

⁷ hours actually spent on dental identification.

⁸ S.S. Noronic Steamship.²

⁹ Six intensive weeks of work for 39 dental personnel; four between December 24 and mid-January; two from mid-January to February 21.

¹⁰ approximate.

only 67 dental records were available, the rate of positive dental identification jumps to 79 per cent. If dental records do not exist, the means of identification through dental means diminishes greatly (see section on methods of dental identification: antemortem).

- 3) *Comparable information:* although antemortem and postmortem data may be available it is not always comparable. It is of little use to have a lower fragment of jaw if only an antemortem maxillary x-ray is available for comparison.
- 4) *Postmortem condition of specimens:* postmortem remains may be unrecoverable or they may have no identifiable dental traits.
- 5) *Secondary identification:* the New Orleans and Dallas crashes had 60 per cent and 68 per cent positive identifi-

cations by dental means but 75 per cent and 72 per cent probable identifications in the respective crashes.¹⁸ Secondary dental identification is an important adjunct to primary identification but statistics regarding secondary identification by dental means are often overlooked or are not available.

6) *Non dental use:* When a cadaver has been positively identified through means other than dental, subsequent dental identification is redundant.

Computers

The use of computers is not new to the identification process.^{29,30,31} The need for computers in a disaster situation should be determined by:

- a) the size of the disaster (number of victims)
- b) the number of specimens (fragmentation of each victim)

- c) the condition of the specimens (fresh, decomposed, skeletal, etc.)
- d) the local conditions (workforce, locale, access, climatic conditions, space)³¹
- e) accessibility to hardware and software.

Identification is a result of reasoning and logic. It involves comparing antemortem to postmortem data and evaluating the quantitative and qualitative similarities/congruences of those data to arrive at logical and correct conclusions. The computer is therefore a means and not an end. It may facilitate the sorting, storage, retrieval, analysis and transmission of data, thus reducing time, expense and labor requirements.

Misidentification

The nemesis of the forensic dentist is a misidentification. Such an error has serious legal ramifications in both civil and criminal proceedings where positive identification is at issue. Therefore one can ill afford to make a false identification. The major circumstance under which a false identification is made is one in which the expert fails to take the appropriate amount of time to study the case adequately. This can be due to external pressures brought to bear from coroners, the police, pathologists or the alleged family of the deceased. The cause for the error is usually a lack of experience on the part of the dentist. One should remember that there is no shame in being meticulous and prudent. In the "trying to please syndrome" the expert arrives at a positive identification without having sufficient evidence to support that status. Additionally, a misidentification can result from incompetence. The unqualified dentist or the non-dentist (coroner, medical examiner, pathologist, dental hygienist) may lack the necessary professional education, knowledge, training and experience in forensic dentistry to form the basis for an expert forensic dental opinion. Δ

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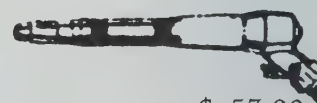
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Ottawa 1990: Convention Countdown

Industry Leading the Way!



The 1989 CDA Convention would not have been possible without the generous support and financial assistance of the dental industry and exhibitors – evidence of a symbiotic relationship that continues to grow. This year once again, contributions provided by dental companies and organizations allows us to give not only gifts and prizes, but also a great convention! Thus, in addition to thanking our regular exhibitors and supporters we wish to send

our very special thanks to the following companies and professional organizations for their continuous support:

Air Canada for providing the prize for our Pre-registration draw – two tickets to any Air Canada destination (excluding Singapore and Bombay).

Ash Temple – Servident for providing the specially designed pens which will be distributed to all delegates in the registration kits and the prizes which will be awarded for Exhibit Hall Attendance. Also, for supporting the publication of the 1990 convention pocket program book.

Aurum Ceramic Dental Laboratories / Classic Dental Laboratories for providing the grand prize for our Exhibit Hall draws – a Chrysler 'Sundance' car, list price – \$17,000.

Butler, O.J. Company for supporting the publication of the 1990 convention pocket program book.

Caulk, The L.D. Company of Canada for sponsoring a pre-convention course, a full-day presentation during the convention proper, as well as supporting the publication of the 1990 pocket program book.

Degussa for sponsoring a lecture during the convention proper.

Denco for supplying the memo pads which will be included in the 1990 registration kits.

Exan for providing the computer hardware and software for computerized registration, on-site support and the Business and Message Centre.

Healthco – Depot Dentaire for supporting the publication of the 1990 pocket program book.

Hoechst Canada Inc. for providing handsome folders to be used for the registration kits which are to be distributed to delegates on site.

Nobelpharma for sponsoring a pre-convention course.

Smith, Kline & French for sponsoring two lectures, assisting in the organization of a vaccination clinic and supporting the publication of the 1990 pocket program book.

In addition CDA Conventions wishes to express its sincere gratitude to the following professional organizations, which have played a key role in the organization of this convention:

Canadian Association of Orthodontists
Canadian Dental Assistants' Association
Canadian Dental Hygienists' Association
Canadian Forces Dental Services
Canadian Fund for Dental Education
Royal Canadian Dental Corps Association
Royal College of Dentists of Canada
University of Toronto – Faculty of Dentistry

*Michel Jahjah, D.D.S.
General Chairman
CDA Conventions*



The scenic Rideau Canal at the National Arts Centre, near Parliament Hill.
(Industry, Science and Technology Canada photo)

Ottawa 1990

Summary of Lectures and Events

Dentists ▪ Hygienists ▪ Assistants ▪ Office Personnel ▪ Spouses

	Congress Centre Room 1B	Congress Centre Room 2B	Congress Centre Room 3B	Congress Centre Room 4B	Congress Centre Room 5B	Westin Provincial Ballroom I	Westin Provincial Ballroom II	Westin Confederation Ballroom I
Saturday, August 25 Samedi 25 août	I. Roseman Endodontics (Hands-on) 8:30 - 11:30 12:30 - 16:00	T. Jemt Implants 8:30 - 11:30 12:30 - 16:00	I. Manji Computers (Hands-on) 12:30 - 16:00			W. Strupp Crown & Bridge 8:30 - 11:30 12:30 - 16:00		
Sunday, August 26 Dimanche 26 août		T. Jemt Implants (Hands-on) 8:30 - 12:00						D. Barnes Practice Management 8:30 - 11:30 12:30 - 16:00
Monday, August 27 Lundi 27 août 8:30 - 11:00	R. Feinman Porcelain Laminates	Grieve Memorial Lecture J. Dale Extractions in Orthodontics		L. Lemian Endodontie	N. Levine Dentistry for the Disabled		M. Balla Communication	
Monday, August 27 Lundi 27 août 13:30 - 16:00	R. Feinman Enamel Colour	T. Limoli Periodontal Prepayments		S. Schwartz Dents Primaires	F. Weine Endodontics		J. Hardie Infection Control	
Tuesday, August 28 Mardi 28 août 8:30 - 11:00	University of Toronto Symposium on Pain B. Sessle 8:30 - 9:40	W. Bottomley Update on Drugs	M. Locherer Sterilization Techniques		H. Pham Chirurgie Buccale	I. Manji High Tech Productivity		RCDC K.J. Paynter Symposium Aesthetics in Dentistry M. MacEntee
Tuesday, August 28 Mardi 28 août 13:30 - 16:00	C. Torneck 9:50 - 11:00 H. Tenenbaum 13:30 - 14:40 D. Haas 14:50 - 16:00		TABLE CLINICS ENTRETIENS CLINIQUES		J. Larivée Parodontie	G. McGivney Complete Dentures		M. Duffy 12:00 - 13:00 D. Precious P. Apse A. Milnes D. Flam A. Kiyak F. Muroff D. Nimchuk
Wednesday, August 29 Mercredi 29 août 8:30 - 11:00						H. Rosen Perio- Prosthesis Patients	G. McGivney Partial Edentulism	J. Chasteen Selecting Compatible Staff

Ottawa 1990

Sommaire des conférences et activités

EXHIBITS

9:00 - 18:00

Monday, August 27 – Lundi 27 août
Tuesday, August 28 – Mardi 28 août

Ottawa Congress Centre – Palais des Congrès
Second Level – Deuxième étage

*Food services will be available in the Exhibit Hall
Le buffet sera servi à la salle d'exposition*

OPENING CEREMONY • CÉRÉMONIE D'OUVERTURE

Sunday, August 26 • Dimanche 26 août
Palais des Congrès, Hull

PRESIDENT'S GALA – BAL MASQUÉ • GALA DU PRÉSIDENT – BAL MASQUÉ

Monday, August 27 • Lundi 27 août
Confederation Ballroom, Westin Hotel • Salle de bal confédération, Hôtel Westin

MEET & GREET BYTOWN BASH • SOIRÉE DES RETROUVAILLES 'SURBOUM DE BYTOWN'

Tuesday, August 28 • Mardi 28 août
Confederation Ballroom, Westin Hotel • Salle de bal confédération, Hôtel Westin

Westin
Confederation
Ballroom II

Westin
Confederation
Ballroom III

Westin
B.C.
Room

Chateau
Adam
Room

Chateau
Drawing
Room

Chateau
Ballroom

Chateau
Banquet
Room

Four Seasons
Rideau
Room

Monday, August 27
Lundi 27 août

8:30 - 11:00

CFDS

M. Cuff
Medically
Compromised
Patient
T. Harle
Osseointegration
P. Demers
Oral &
Maxillofacial
Infections
M. Matthews
Dentofacial
Deformities

LUNCH
by reservation

DÉJEUNER
sur réservation

12:00 - 13:00

M. Locherer
Equipment
Maintenance

A. Kincheloe
Esthetics

L. Smith
Humour
as a
Healer

Monday, August 27
Lundi 27 août

13:30 - 16:00

V. Jinoian
Ceramic for
Porcelain
Bridges

M. Michaud
Des lésions
buccales

A. Kincheloe
Esthetics

L. Smith
Nutrition to
Control
Stress

Tuesday, August 28
Mardi 28 août

8:30 - 11:00

M. Balla
Stress
Management

LUNCH
by reservation

DÉJEUNER
sur réservation

12:00 - 13:00

R. Phillips
Restorative
Materials
Part I

S. Schwartz
Luxated
Permanent
Incisors

A. Linder
Soft
Tissue
Management

F. Weine
Curved
Canals

Tuesday, August 28
Mardi 28 août

13:30 - 16:00

D. Rekow
CAD/CAM
Systems

R. Phillips
Restorative
Materials
Part II

M. Hourigan
Camera
Clinic

J. Chasteen
Four-Handed
Dentistry

T. Limoli
Third Party
Dental
Care

Wednesday,
August 29
Mercredi 29 août

8:30 - 11:00

W. Bottomley
Oral
Lesions

M. Hourigan
Oral
Surgery
Review

D. Rekow
CAD/CAM
Challenges

DENTAL HYGIENISTS' PROGRAM

The **Canadian Dental Hygienists' Association** has worked diligently to ensure the CDA Scientific Program meets the needs of dental hygienists. Outlined below is a list of the programs which may be of special interest to dental hygienists attending the Convention.

Pre-Convention

Saturday, August 25th

William Strupp, D.D.S.	Predictable Anterior Crown & Bridge
Imtiaz Manji, B.Sc.	The First Step to High Tech (Hands On)

Sunday, August 26th

Dick Barnes, D.D.S.	Building a More Successful Practice
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Convention Proper

Monday, August 27th

Allen Kincheloe, D.D.S.	Esthetics for the 1990's Dental Management of the Medically Compromised Patient Osseointegration and the Rehabilitation of Partial Edentulism: Clinical Aspects Management of Oral and Maxillofacial Infections Dentistry for the Disabled
Murray Cuff, D.D.S., M.R.C.D.(C)	
Tom Harle, D.D.S., DIP (Prosth)	
Paul Demers, D.D.S., M.Sc.	
Norman Levine, D.D.S., M.Sc.D., F.R.C.D.(C)	Periodontal Problems with Prepayment Les traitements des dents primaires Le diagnostic des lésions buccales: quoi de neuf? Equipment Maintenance Effective Communication Between Staff and Clients An Update on Infection Control
Tom Limoli, D.D.S.	
Stéphane Schwartz, D.D.S., M.S.D.	
Monique Michaud, D.D.S., M.S.D.	
Maureen Locherer, P.D.A.	Humour as a Healer Nutrition to Control Stress
Marion Balla, M.Ed., M.S.W.	
John Hardie, B.D.S., M.Sc., F.R.C.D.(C)	
Lendon Smith, M.D.	

Tuesday, August 28th

Matthias Hourigan, D.D.S.	Camera Clinic for Slide Shooters
William Bottomley, D.D.S., M.S.	An Update on the Drugs Your Patients Take
Tom Limoli, D.D.S.	Overview of Third Party Dental Care
Annette Ashley Linder, R.D.H., B.S.	Implementing Soft Tissue Management
Mike Duffy	Ottawa From the Inside
Jacinthe Larivée, D.M.D., M.R.C.D. (C)	Standards d'excellence de la parodontie clinique
Imtiaz Manji, B.Sc.	High Tech Productivity & Practice Management

Table Clinics

Ralph Phillips, M.S., D.Sc.	What's New In Restorative Materials (I & II)
Marion Balla, M.Ed., M.S.W.	Stress Management in Personal Relationships
Maureen Locherer, P.D.A.	Sterilization Techniques and Infection Control

Wednesday, August 29th

William Bottomley, D.D.S., M.S.	Diagnosis & Treatment of Common Oral Lesions
Joseph Chasteen, D.D.S., M.A.	Selecting Compatible Members of a Dental Team

DENTAL ASSISTANTS' PROGRAM

The **Canadian Dental Assistants' Association** has put forth a great effort to ensure the needs of dental assistants are met during the 1990 CDA Convention. Outlined below are the lectures recommended for dental assistants.

Pre-Convention

Saturday, August 25th

William Strupp, D.D.S.	Predictable Anterior Crown & Bridge
Imtiaz Manji, B.Sc.	The First Step to High Tech. (Hands On)

Sunday, August 26th

Dick Barnes, D.D.S.	Building a More Successful Practice
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Convention Proper

Monday, August 27th

Allen Kincheloe, D.D.S.	Esthetics for the 1990's Dental Management of the Medically Compromised Patient Osseointegration and the Rehabilitation of Partial Edentulism: Clinical Aspects Management of Oral & Maxillofacial Infections Dentistry for the Disabled
Murray Cuff, D.D.S., M.R.C.D.(C)	
Tom Harle, D.D.S., DIP (Prosth)	
Paul Demers, D.D.S., M.Sc.	
Norman Levine, D.D.S., M.Sc.D., F.R.C.D.(C)	Porcelain Laminates – A Seven Year Update Chemical Alterations of Enamel Color – The Bleaching Boom Periodontal Problems with Prepayment Les traitements des dents primaires Equipment Maintenance Effective Communication Between Staff and Clients An Update on Infection Control
Ronald Feinman, D.M.D.	
Tom Limoli, D.D.S.	
Stéphane Schwartz, D.D.S., M.S.D.	
Maureen Locherer, P.D.A.	Humour as a Healer Nutrition to Control Stress
Marion Balla, M.Ed., M.S.W.	
John Hardie, B.D.S., M.Sc., F.R.C.D.(C)	
Lendon Smith, M.D.	

Tuesday, August 28th

Stéphane Schwartz, D.D.S., M.S.D.	Diagnosis and Treatment of Luxated Young Permanent Incisors
Matthias Hourigan, D.D.S.	Camera Clinic for Slide Shooters
William Bottomley, D.D.S., M.S.	An Update on the Drugs Your Patients Take
Tom Limoli, D.D.S.	Overview of Third Party Dental Care
Mike Duffy	Ottawa from the Inside
Imtiaz Manji, B.Sc.	High Tech Productivity and Practice Management

Table Clinics

Ralph Phillips, M.S., D.Sc.	What's New in Restorative Materials (I and II)
Marion Balla, M.Ed., M.S.W.	Stress Management in Personal Relationships
Joseph Chasteen, D.D.S., M.A.	The Joy of Four-Handed Dentistry
Maureen Locherer, P.D.A.	Sterilization Techniques & Infection Control

Wednesday, August 29th

William Bottomley, D.D.S., M.S.	Diagnosis and Treatment of Common Oral Lesions
Joseph Chasteen, D.D.S., M.A.	Selecting Compatible Members of a Dental Team

Ottawa 1990

"Test Your Dental Knowledge"

In the Exhibit Hall at the CDA Convention

**This year the Exhibit Hall has
an added attraction!**

The "Test Your Dental Knowledge" Display will provide you with an opportunity to assess your dental knowledge through self-evaluation in an atmosphere offering fun and a challenge.

Find out if you're up to par...

Drop by the Exhibit Hall and browse through the display. You may even learn something new from the experience!



1990 CDA Fun RUN

When:

Monday, August 27th ■ 7:30 a.m.
■ Transportation will be provided ■

Where:

The Arboretum
Central Experimental Farm ■ Ottawa

Why:

For the **FUN** of it!
See you there!



Jog, walk, run or cart-wheel through the 10 kilometre course ... it's up to you! For some it will be a serious challenge – for others, just a grand opportunity to get some fresh air and exercise in one of Ottawa's unique attractions — the Arboretum.

Located alongside the Rideau Canal, the Arboretum is home to a fine collection of Canadian and exotic trees.

Register today for the 1990 CDA Annual Fun Run !

Ottawa 1990

Vaccination Clinic

Engerix[®]-B
Hepatitis B vaccine
(recombinant)

With the cooperation of Smith Kline and French, a vaccination clinic against the Hepatitis B virus will be offered to dentists, hygienists, assistants and technicians at a special rate for CDA convention participants.

The 3-dose program includes the injection of a first dose on site and the mailing of the 2nd and 3rd doses after the convention.

If you have already been vaccinated, the National Advisory Committee on Immunization feels that a booster dose after 5 years may be prudent.

ON SITE REGISTRATION ONLY.

Convention Registration Another Step Forward

CDA Conventions is proud to announce that, thanks to the innovative thinkers at **EXA Technologies Inc.**, on-site registration for the 1990 Ottawa Convention will be made easier and more accessible.

Delegates registering on-site will be able to do so at one of three convention sites:

Congress Centre
Westin Hotel
Chateau Laurier Hotel

However, if you wish to avoid the line-up ... beat the rush by pre-registering.

The Deadline for convention pre-registration **has been extended** to July 25, 1990.

Mike Duffy

"Ottawa from the Inside"

Tuesday, August 28

12 Noon – 1:00 p.m.

The 1990 edition of the **Murray McDonald Memorial Lecture** sponsored by the Canadian Fund for Dental Education (CFDE) will feature an address by Mr. Mike Duffy.

Many Canadians have come to realize that one way to follow what has happened in the country from one week to the next is to watch *Sunday Report* with Mike Duffy. A veteran of fourteen years with the CBC, Mr. Duffy has brought his unique style to CTV News in a program that is as wide ranging as his long journalistic career. Mr. Duffy delivers his serious insights against a backdrop of rollicking political humour — what else would one expect from a man who was named by *Chatelaine* as one of Canada's ten sexiest men!



Ottawa 1990 Social Program

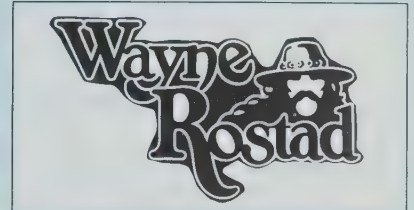
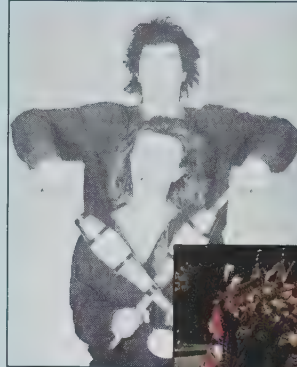
Sunday, August 26

Opening Ceremony

Palais des Congrès
Hull, Quebec

- Bus pick-up at the Westin Hotel •

This year's opening ceremony will include a flag procession featuring the Pipes and Drums of the Cameron Highlanders of Ottawa, a superb juggling act with "Jeanginus et Nicolette", a performance by the young and talented McCullagh Step Dancers with music by 'The Brigadoons' of Cornwall, Ontario and other surprises. Also featuring Wayne Rostad, host of CBC's 'On the Road Again'. Wayne is sure to get your feet stomping, your hands clapping and your face smiling before the night is through!



STEVENS & KENNEDY

Monday, August 27

President's Gala – Bal Masque

Westin Hotel

The *Bal Masque* is an event offering convention delegates an evening of dining and dancing.

This evening's social extravaganza is a black-tie (optional) affair, however, **the wearing of a mask is mandatory**. Prepare for an evening of elegance and class, with an added element of intrigue. Do bring a mask as prizes will be awarded for the evening's best.

'Stevens & Kennedy', the ultimate, versatile band will perform 'The Best in Live Music'. Ballroom, big band, rock & roll, disco and top forty sounds in a variety of styles, from acoustic to electronic.

Tuesday, August 28

Meet & Greet at the 'Bytown Bash'

Westin Hotel

A change of style that'll make you smile! The 'Bytown Bash' is the prime opportunity to get together with the members of your dental team for an evening of fun and frolic.

Lively dancing to the music of 'Isle of Skye' recording artists, The Cadillacs, Ottawa's newest and fastest moving party band. The Caddie's repertoire reads like the top of the pop charts for the 50's, 60's, 70's, and 80's. Cash bar.



Babysitting Service – Monday and Tuesday Evening

Thanks to the efforts of the Spouses' and Children's Committee, babysitting services will be offered on a 'first-come, first-served' basis to convention delegates. ON SITE RESERVATIONS ONLY – SUBJECT TO AVAILABILITY.



Ottawa 1990

1990 Spouses' Program

Co-ordinated by: Ottawa Dentist's Wives Association

Marg. Rowat, President
Mary-Margaret Webster, First Vice-President

The Four Seasons Hotel, Ottawa (150 Albert St.) has been designated as headquarters for the Spouse Program as most activities offered through the program will occur there. However, registrants to the program will be required to present their 'Spouse Program Registration ticket' to staff at the Spouses' Program Desk in the "Registration Area" (second level) of the Ottawa Congress Centre. At that time, registrants will be asked to confirm their attendance at the two lunches included in the Spouse Program Package.

Registration to the Spouses program allows access to the entire Scientific Program and the Exhibit Hall. In addition, a special program has been designed for those registering for the Spouse Program.

Monday, August 27

"Humour as a Healer"

Lendon Smith, M.D.

Locale: Four Seasons Hotel
Rideau Room
Hours: 8:30-11:00

Dr. Smith, a.k.a. 'The Children's Doctor' says a good self-image and the ability to laugh are the most important things in life. During his morning presentation he will elaborate on this philosophy. Dr. Smith has practiced pediatrics in Portland, Oregon for more than 35 years. His relaxed, reassuring approach to medicine takes much of the trauma out of ordinary childhood ailments while alleviating the guilt and anxieties parents may harbour.

Lunch/Fashion Show

Locale: Four Seasons Hotel
Hours: 12:00 - 13:00

A private luncheon for all registrants to the Spouses' Program will be served at the Four Seasons Hotel. The exact location will be confirmed on your luncheon ticket. Cost is included in the registration fee.

During lunch, a fashion show featuring clothing by 'Aquascutum'.

"Nutrition to Control Stress"

Lendon Smith, M.D.

Locale: Four Seasons Hotel
Rideau Room
Hours: 13:30 - 16:00

Dr. Smith's afternoon presentation will focus on nutrition and stress. Smith will discuss how 'junk food wrecks the brain'. While doing so he will leave you with plenty of good food for thought.

Rideau Canal Boat Tour

Hours: 14:00-15:30

This afternoon, registrants to the Spouses' Program may opt to discover Ottawa on a Rideau Canal Boat Cruise. The boat will depart from its dock (located next to the Government Conference Centre at the corner of Sussex and Rideau) at 2:00 p.m. and will return to its point of departure approximately 1 hour later. Sites you'll pass by include the National Arts Centre, the Rideau Centre Complex, the Government Conference Centre, Lansdowne Park - home to the Ottawa Roughriders national football team, Dow's Lake and the Central Experimental Farm.

Ottawa 1990

1990 Spouses' Program

Tuesday, August 28

National Art Gallery

Locale: National Gallery of Canada
Hours: 10:00 - 12:00

A bus will pick-up registrants to the Spouses' Program between 9:30 and 9:45 at the convention hotels and transport them to the National Art Gallery of Canada (Sussex Drive). Tours of the Gallery will be offered at 10 am and 11 am, tours run approximately an hour in length. Those not wishing to join a tour may wander at their leisure.

Lunch/Fashion Show

Locale: National Gallery of Canada
Restaurant des beaux-arts
Hours: 12:00 - 13:30

Lunch will be served in the private dining room of the National Art Gallery. During lunch, models will parade in fashions "From the Sublime to the Ridiculous" (lingerie and furs).

"Bringing Out the Best in Our Children"

Marion Balla, M.Ed., M.S.W.

Locale: National Gallery of Canada
Restaurant des beaux-arts
Hours: 13:30 - 14:30

As parents, we all wish to create a safe, strong and positive relationship with our children. To ensure this we must offer messages that children are lovable and capable. This presentation will focus on strategies to assist parents and children to enjoy each other on a daily basis as well as strategies to encourage children to take ownership for their own lives.

Marion Balla, co-director of The Adlerian Centre for Counselling and Education in Ottawa, has been involved in the counselling field since 1969. As a clinician, she offers individual, couple and family counselling to the community. She also facilitates workshops, courses and seminars focused on constructive approaches to human relationships in the family, workplace and community. She is the mother of two daughters, ages sixteen and thirteen.

Children's Program

**Monday, August 27
& Tuesday, August 28**

YM/YWCA

180 Argyle St.
Buses depart: 8:30 a.m.

Children will be picked up at the convention hotels between 8:30 and 9:00 and transported to the YM/YWCA. They will have access to gymnasium facilities and a swimming pool while at the 'Y' and will be served lunch there also.

Organized tours to the following events/museums will occur on both Monday and Tuesday. Children will be divided into age groups and will have an opportunity to visit all sites listed at least once, on either Monday or Tuesday:

Parliament Hill

Changing the Guard ceremony
(weather permitting)

The Ceremonial Guard is made up of two of Canada's most historic regiments: The Governor General's Foot Guards (red plumes) and the Canadian Grenadier Guards (white plumes). The parade forms up at the Cartier Square Drill Hall at 9:30 and marches up Elgin Street to reach the Hill at 10:00 a.m.

National Aviation Museum

Rockcliffe Airport, Ottawa

Children will have an opportunity to travel back in time to February 23, 1909, when the *Silver Dart* (a replica of which is on display) made the first powered flight in Canada. See also the Sopwith Snipe, the trusty aircraft of WWI ace Billy Barker, The Curtiss JN-4 and the ill-fated Avro Arrow No. 206. A 'Walkway of Time' will lead children through the successive eras of aviation. Air-oriented video games and several theatres will also entertain them.

National Museum of Science and Technology

1867 St. Laurent Boulevard, Ottawa

Children will have the opportunity to view exhibits ranging from the huge locomotives and vintage autos to printing presses and agricultural tools.

Return and Pickup:

Children will be returned and dropped off at the entrance to the Congress centre between 2:00 and 2:30 p.m.

Ottawa 1990

Exhibitors List / Liste des exposants

3M Canada Inc. 301

A

A-Dec Inc. 300, 302
 Abel Computers Ltd. 821, 823
 Advanced Dental
 Concepts, Inc. 1017
 Amadent / American
 Medical & Dental Corp. 811
 American Dental Association 3001
 Anchor Implant Systems Inc. 827
 Arrowhead Management 2011
 Aseptico Inc. 411
 Ash Temple Ltd. 418, 420, 422,
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Astra Pharma Inc. 202
 Aurum / Classic Dental
 Laboratories Ltd. 410, 511
 Aurum Ceramic Dental
 Laboratories Ltd. 414
 Aurum Crest Dental
 Laboratories Ltd. 412

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 Benson / Porter 603
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 Bonarch Supply Canada Ltd. 3004
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 Buffalo / Bolton Dental
 Mfg. Inc. 1021
 Burroughs Wellcome Inc. 409
 Business and Message
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 803
 Busse Dental Supplies 118
 Butler, J.O., Company 415

C

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 Systems Inc. 106
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 Canadian Dental
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 611, 613, 615
 Canadian Dental Supply 305
 Caulk, The L.D., Co. of Canada -
 Ash / Detrey 706, 708, 710,
 712, 714
 CDSPI 610, 612, 614
 Cerum Dental Supplies Ltd. 406
 Cerum Ortho Organizers 507, 509
 Charge / Dent Ltd. 408
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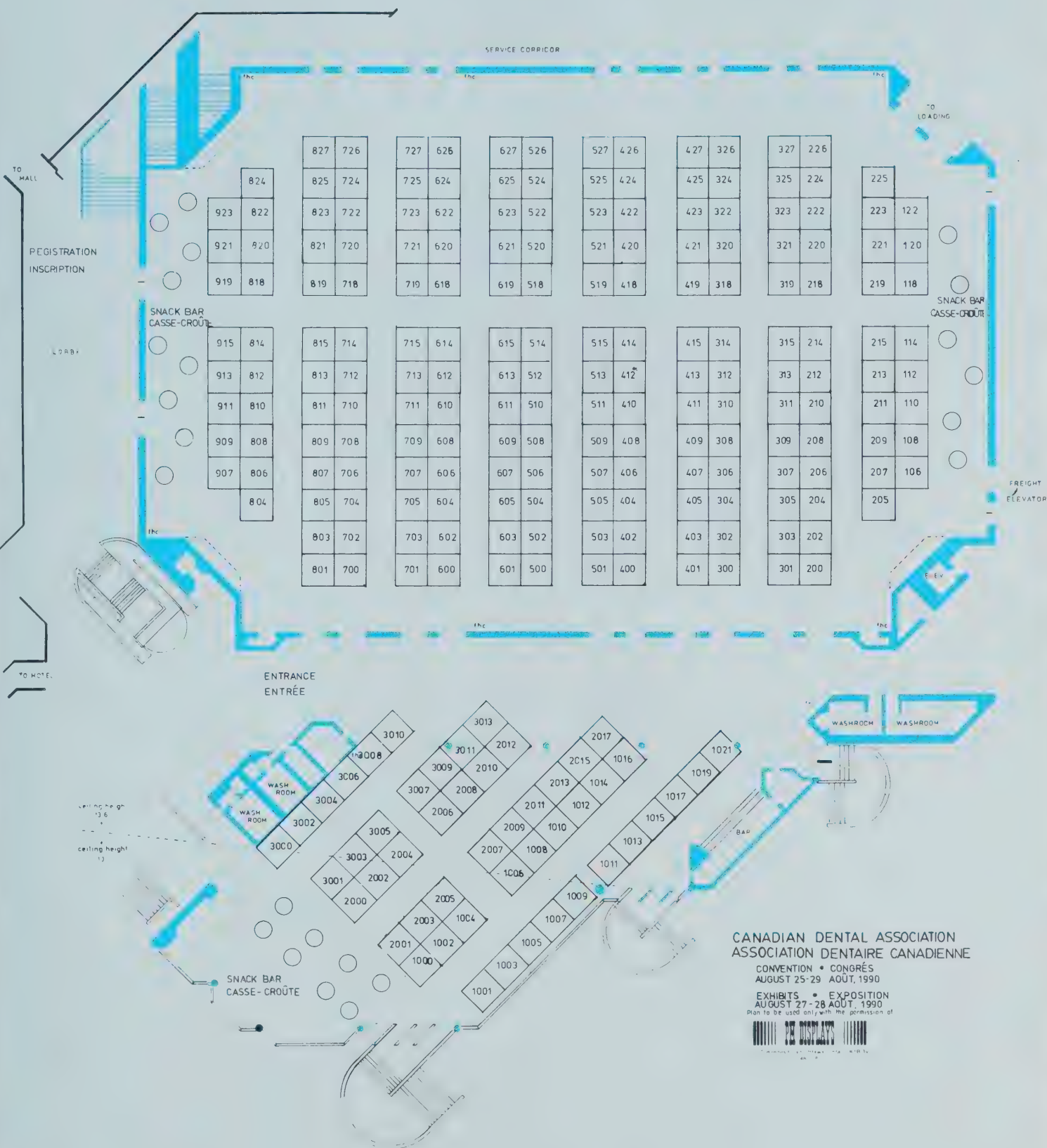
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CANADIAN DENTAL ASSOCIATION CONVENTION

Ottawa ■ August 25 - 29, 1990

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CDA Membership Number: _____ License Number: _____

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K1G 3Y6

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 - 4 Novotel
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 - 7 National Gallery of Canada/
Musée des beaux-arts du Canada
 - 8 Parliament Hill/
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1990 CANADIAN DENTAL ASSOCIATION CONVENTION

August 25 - 29, 1990 ■ Ottawa, Ontario



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Please check appropriate category:

☐ Dentist ☐ Hygienist ☐ Assistant ☐ Exhibitor ☐ Office Personnel ☐ Other (please specify) _____

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Address: _____

City: _____ Province: _____ Postal Code: _____

Telephone: () _____ () _____
(Residence) (Office)

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In order to reserve a room, a guarantee for the first night is essential. The guarantee will apply to the first night ONLY.
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Ottawa 1990

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This prize is donated by **Aurum Ceramic Dental Laboratories and Classic Dental Laboratories**

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Be **sure** to visit the Exhibit Hall and deposit your entries!

Ottawa 1990

How to register for the CDA Convention

Filling out Your Registration Form

1. Register early, some courses and events have limited attendance.
2. There is only one registration form to be used by all categories of participants.
3. Use one form per person (photocopy for several registrants).
4. Spouses and children should have a separate form for each individual.
5. Total the dollar amount of activities and courses you plan to attend, and either provide the necessary credit card information or make cheque payable to the Canadian Dental Association.
6. If your payment covers the cost for several registrants, your name or company name should be clearly indicated in the appropriate space on each registration form.
7. If hotel accommodation is needed, fill out the hotel reservation form.
8. If travel arrangements are needed, call Air Canada Convention Central for the best rates and services.

Filling out Your Hotel Reservation Form

1. Reserve early. August is a very busy month in Ottawa. We have negotiated for you the best rates possible at many of Ottawa's luxury hotels, but hotel rooms are limited in number.
2. CDA is handling the hotel reservations in house, so you will not be able to reserve directly with the hotel.
3. Use one reservation form per room.
4. Your reservation will be confirmed by the hotel.
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6. Any further changes to reservations should be made through CDA headquarters.

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Air Canada has been appointed the sole official carrier for the Canadian Dental Association 1990 Annual Convention in Ottawa. Special arrangements have been made with Air Canada to offer convention participants discounts on air fares. To take advantage of this service, you must call Air Canada's Convention Central when booking your tickets (your travel agent can call on your behalf). Dial **1-800-361-7585**. The Convention Central hotlines are open **weekdays, 8:30 a.m. to 8:00 p.m. EST/EDT**. Identify yourself and the CDA convention. Air Canada's convention experts will do the rest. The lowest fare available will be confirmed to you, subject to availability and advance purchase conditions.

Fly Canada's #1 Convention Airline to the 1990 CDA Convention in Ottawa, and SAVE. Through Convention Central, you also have the opportunity to save on car rentals. Ask for details when booking your flight. The Convention Central staff are eager to help in any way.

Not to be overlooked, Air Canada has graciously offered two economy class return tickets good for travel on any Air Canada serviced destination (except Bombay and Singapore). This will be the prize awarded in our Advance Registration Draw. To be eligible for the draw, dental team members must register for the convention before July 10, 1990.

AIR CANADA 
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No Holds: Barred Dental Assisting in Prison

by Corinne A. Lee, BSc, BA

The usual challenges associated with working as a dental assistant in private practice — relating well with staff, patients, and one's employer; organizing instruments and equipment; keeping alert, speedy, and deft — are trebled when working in a maximum security prison. Fear of bodily harm from patients charged with crimes ranging from robbery to sexual assault to murder is a continual source of anxiety. A further psychological adjustment is required, if, as in my case, you are a woman working in an all-male prison.

Contrary to popular belief, there are no actual bars in such an institution. Thick walls and steel doors that slam shut several times a day are the primary security features. A control centre operates the elevator system. All eating utensils are plastic. Inmates are not permitted to use any metal objects.

My several years' experience as a chair-side dental assistant in a correctional facility — in fact, being the first and only assistant to work in such an environment — has equipped me with a useful source of comparison between the assistance skills expected in private practice and those required in incarcerative environments. To begin with, many worries specific to private practice, such as volume, no-shows, and complaints about high fees, simply do not exist within the prison environment. There's always a waiting list of patients. All inmates are escorted to their appointments by a guard, and dental care is provided free to prisoners.

On the other hand, in a prison environment, you are in contact with potentially dangerous people suffering from any number of diseases, i.e., hepatitis, trenchmouth, STD's, narcotics withdrawal. Whereas in private practice it is desirable, even necessary, for the assistant to be able to put the patient at ease with friendly conversation and a relaxed and pleasant manner, in prison practice, the opposite is true. In fact, familiarity between staff and inmates is prohibited. It is of the utmost importance that conversation, for example, be limited to



superficial and impersonal subjects only. To that end, last names only are used. For my own protection, I decided to use a false first and second name. The veto on personal discussion is based on a sane rationale: information about oneself or one's family can provide "ammunition" which an inmate can use against you or to manipulate you. A similar rationale proscribes excessive humour. Joking with an inmate can prove to be distracting and potentially dangerous for the assistant.

In private practice, it is customary to gently touch a patient to reassure and to comfort, but in prison, any such sympathetic physical contact can render the assistant vulnerable to inmates looking for a chance to take control of the situation.

In general, most inmate behaviour does not pose problems. Inmates were easy to get along with and had no hidden agendas or ulterior motives. Nevertheless, personal safety was an ongoing concern because of the presence of a few recidivists (repeat offenders) who were seasoned manipulators and presented potential danger to the health staff.

I recall a couple of situations which demonstrate inmates' efforts to gain my confidence. One inmate who had been almost imperceptibly stroking my arm, suddenly grabbed my elbow. I immediately broke contact, called the guard, and

had the inmate charged under the Correctional Centre rules. Any touching of staff by inmates was not tolerated and subject to immediate "consequencing". Another inmate, charged with a serious indictable offense, had a reputation for being violent. It was expected that he would try anything while imprisoned to prevent his extradition to another country where he faced possible capital punishment. I had worked on him several times before, but, out of concern for my personal safety, I decided to leave the dental clinic after learning that he was to return for further treatment. The inmate apparently enquired about my whereabouts, then presented the dentist with a bar of candy to give to me. Authorities recorded this action in his chart as bribery.

Inmates bent on manipulation look for weakness in health professionals and caregivers. During my stay there, I had the pleasure of working closely with a diverse range of health professionals including doctors, psychologists, psychiatrists, and nurses. Many offered emotional support, guidance, camaraderie, and comic relief. We would watch out for each other while working in this well-run network of referrals (most patients were self-referred, their appointments approved by hospital staff). In the event of trouble, help was always just around the corner.

Needless to say, I had to become strongly assertive so that inmates would not look upon me as a defenseless female who would overlook things and allow them to take certain liberties. I had to let them know that I was not going to be flattered, distracted, or used. Often, I had to speak sharply and loudly in order to settle patients. Many of the inmates would come into our clinic, glare threateningly, and express their hatred of dentists and dentistry. Very often, it seemed difficult for inmates to relate to my giving orders and directions, probably because I am of a visible minority as well as female. I learned very quickly that in order to earn their respect, I had to demonstrate unwavering strength of character, marked by a sober demeanour, assertiveness, and fearlessness. Once my inflexibility was established, I instilled more fear in the inmates than the needle! (Curiously, the patients most afraid of dental syringes were hard-core heroin addicts.)

I have also worked in minimum security environments where inmates are free to wander around the hallways unsupervised. This can be disconcerting, to say the least. In my three-year stint at a maximum security prison, there was some comfort knowing that I would never be left alone with a prisoner. A guard was always present. Nevertheless, I worked with the constant awareness that I could get hurt or be taken hostage at any time. I therefore trained myself to be ready for any emergency — indeed, my response time to codes announcing dangerous situations was honed to lightning-quick speed. During such times, the medical staff would lock inmates in a central room, then secure themselves in a safe place until the alert was over.

My observations led me to conclude much about the typical inmate while I was working in this environment. So many of our charges were recidivists who had made a career of unlawful activities. Most of these were under-educated and had suffered from family violence and abuse. Moreover, there were many cases of substance abuse which further debilitated individuals' health. Most inmates were totally unaware of the seriousness of their dental and/or medical conditions, and, as a matter of habit, had chosen to ignore their own discomfort and pain. Typically, they had received little or no education about dental hygiene from their families or schools. As a result, they did not know enough to seek help for their problems. Similarly, good nutrition was foreign to them. For them, day-to-day survival took the form of other priorities. Certainly, the direct link between poor

diet and periodontal disease or dental caries was never understood in these patients. To them, living in prison was preferable to living on the streets with no shelter, food, or health care.

Presently, I work as an employment counsellor for street kids, many of whom have already experienced life behind bars. Although most are younger than the patients I saw in prison, many have similar backgrounds (substance abuse, physical and emotional abuse and violence, limited education).

I learned much from my experience working in correctional institutions, not least of which was the complex defence mechanisms triggered in people who later fit the typical inmate profile. Whether as subtle as teasing, sarcasm, or withdrawal, or as obvious as outright violence, it seems that the more it hurts inside, the stronger the compulsion to bring that pain to the exterior and direct it elsewhere.

Below is a checklist of safety habits to practise when working as a dental auxiliary in a prison environment:

- Ensure that the passageway between yourself, the dentist, and the exit door is clear at all times.

- Keep all instruments on trays out of sight and reach of inmates; never allow inmates to touch instruments, even evacuator tips. Do not give out pieces of dental floss.
- Never turn your back on an inmate. Make sure that you are not left alone in a room out of sight of a guard. Learn to keep your eyes and ears open.
- Never wear dangling jewellery or clothing (neckties, for example) or anything that the inmates can reach out and grab.
- Never agree to pass on messages, oral or written, or objects, from one inmate to another.
- Notify the guard immediately if you suspect that instruments or pieces of equipment are missing. Have the inmate searched.
- Discuss nothing of a personal nature with inmates; avoid talking about other inmates and staff; avoid using first names. Divulge nothing about yourself, your likes, dislikes, or opinions.

Recommended Reading

Allen, Bud; Bosta, Diana. *Games Criminals Play./How You Can Profit by Knowing Them*. Rae John, Publishers, 1981.

Move ahead with CDA



Canadian Dentistry in Action

Specialty Features

Ontario dental assistants' job satisfaction: Relationship to work stress and intention to change jobs

D. Burman, DDS, DDPH, MSc, PhD

ABSTRACT

Low job satisfaction has been linked to rapid turnover of dental assistants with resultant loss of productivity and reduced quality of patient care. Work dissatisfaction has also been linked to stress related diseases. The aim of this mailed survey of 1,000 Ontario certified dental assistants was to test a survey instrument developed in the United States and to relate satisfaction to work stress and to the intent to change jobs. Eighty-one per cent of eligible subjects responded. The satisfaction sub-scales of the survey instrument were found generally to have acceptable construct validity and to be reliable when applied to an Ontario population. However, some minor modifications were necessary. Although over 36 per cent said they were generally very satisfied with their work, the intent to change jobs was significantly related to areas of dissatisfaction concerning recognition for work done and opportunities for personal and professional growth. Stress was related to dissatisfaction with work-related fatigue, time pressure and non-patient tasks. These findings have implications for dental practice management.

SOMMAIRE

Parce que les assistantes dentaires éprouveraient peu de satisfaction au travail, elles changeraient souvent d'emploi, causant une baisse dans la productivité et dans la qualité des soins donnés aux patients. L'insatisfaction serait en outre liée à des maladies dues au stress. En Ontario, on a posté à 1,000 assistantes dentaires autorisées un questionnaire dont le but était d'essayer un sondage préparé aux États-Unis et de lier la satisfaction au travail au stress et au désir de changer d'emploi. Parmi les personnes admissibles, 81 pour cent ont répondu. En général, les échelles utilisées pour mesurer le degré de satisfaction au travail ont paru avoir une valeur constructive acceptable et être assez bonnes pour évaluer la population de l'Ontario. Des modifications mineures se sont toutefois imposées. Bien qu'il y ait eu 36 pour cent des personnes interrogées qui ont déclaré être généralement satisfaites de leur travail, on a découvert que le désir de changer

TABLE I

Satisfaction items grouped into sub-scales

Thinking about your work during the past month, how satisfied would you say you were with the following aspects of being a dental assistant?

General Satisfaction

... your work in general these days?

Income

... the income you receive from your work in this dental practice?

Having to do unpleasant work

... the number of things you have to do in the office that you dislike?

... the amount of checking up on the work of others that you must do?

... the amount of your time devoted to doing things that could be done by others with less training and experience?

... the amount of paperwork that you must do?

... the amount of supervising you have to do?

Quality of patient care in office

... the competence of the office staff?

... the quality of care given by the dentist(s)

... with your opportunity to provide high quality care?

... the quality of dental care provided by the auxiliaries in the office?

Praise and recognition

... the praise you receive for work done particularly well?

... the recognition you receive for doing a good job?

Personal and professional growth

... with opportunities to advance your career?

... the opportunity for personal growth through your work?

... the prestige associated with your work?

... the amount of challenge in your work?

Skills development at work

... the time you have for professional contact with colleagues?

... the time and opportunity to keep up with the field of dentistry?

... the time and opportunities to improve your skills?

Assigned responsibilities

... the opportunity to use your skills, training and talents to the fullest?

... the amount of responsibility entrusted to you?

... the variety of things you do in the office?

... the duties delegated to auxiliaries?

... the opportunity to be helpful to patients?

Staff care for each other

... the concern that staff members show toward each other?

... the amount of help the office staff give to each other?

... how well the office staff works together?

Job stress and strain

... fatigue from work?

... frustrations during work?

... the amount of on the job pressures?

... physical problems resulting from the office eg eyestrain, back pain, headache?

Time pressure

... the amount of time you have with each patient?

... the amount of time available to get the job done?

... feeling rushed?

Items not grouped into scales

... the amount of time you have for leisure?

... OHIP and other benefits?

... how well your duties are explained to you?

... the number of hours you devote to the practice?

... getting off work on time?

d'emploi était relié d'une façon significative à une insatisfaction touchant la reconnaissance pour le travail fait et les occasions pour la croissance personnelle et le développement professionnel. Le stress était lié à l'insatisfaction causée par la fatigue au travail, les contraintes de temps et les tâches n'ayant rien à voir avec la gestion des patients. Ces découvertes ont des conséquences pour la gestion du cabinet.

Job dissatisfaction and work-related stress among dental assistants have emerged as significant issues among members of the dental health professions and their professional organizations. They are important insofar as they are related to job turnover and the long-term commitment to dentistry of auxiliary staff. Given the team nature of dental practice and the nature of the working relationships between dental health care personnel, continuity of staff is highly desirable. The loss of dental assistants can have an adverse effect on practice efficiency and productivity¹ and, given the role of the dental assistant with respect to the technical and interpersonal aspects of dental practice, can impact on the quality of dental health care delivery.²⁻⁴ Even where stress and dissatisfaction do not lead to job turnover, they are likely to lead to less than optimal job performance, especially in relation to the significant patient management work undertaken by the dental assistant.

Job turnover is a problem which has its impact at the level of the dental practice. Another problem is the loss to dentistry of trained personnel, since dissatisfaction with work and job opportunities are responsible for a high degree of attrition of community college trained certified assistants.¹ Recent editorials in leading dental journals have pointed to the financial loss associated with dental assistant turnover and the increasing difficulty of recruiting assistants from among the shrinking labour pool provided by young women.^{5,6}

Little of the information on dental assistants has been gathered systematically, however, and none of it has pertained to the Canadian health care environment. This paper presents some of the results of a study of dental assistants in Ontario which aimed to measure work stress, job satisfaction and future career intentions.

Materials and Methods

The sampling frame for the study was the membership list of the Ontario Dental

TABLE II

Response to the Survey

	n	%
Initial Sample	1000	
No longer working in dental practice	38	
Eligible sample	962	100.00
Completed questionnaire	781	81.2
Returned by Post Office	17	1.8
Returned blank or incomplete	6	0.6
Arrived too late to be included	2	0.2
No response	156	16.2

Nurses and Assistants Association (ODNAA). This is the only available listing of dental assistants in Ontario and includes only certified dental assistants, who comprise just over half of the estimated 10,000 dental assistants in the province.

One thousand names and home addresses were randomly sampled from the ODNAA membership list. A questionnaire was sent to all subjects concerning job satisfaction and work related stress, along with a covering letter explaining the purpose of the study and a stamped, addressed, return envelope. A letter written by the Executive Director of the ODNAA was included. Two weeks after mailing, non-responders were sent a reminder letter and after a further two weeks another questionnaire, letter, and stamped, addressed return envelope were sent to those who still had not responded.

Measures of Job Satisfaction

The measure of work satisfaction used in the study was adapted from the scale developed by Chapko et al.⁷ as part of the Washington State Dental Auxiliaries Project. Questionnaire items were organized into a general satisfaction measure and nine sub-scales, namely satisfaction with: "Having to do unpleasant work", "Praise and recognition" for doing a good job, opportunity for "Personal and professional development" and for "Skills development", "Assigned

responsibilities", "Positive staff relations", "Quality of patient care", "Job stress and strain" and "Time pressures". Each item was measured from One – "very satisfied" to Six – "very dissatisfied".*

Satisfaction with income was a single item variable. The few modifications that were made to Chapko's satisfaction scales made them more applicable to the Ontario practice environment and improved internal consistency reliability. **Table I** shows items grouped into sub-scales.

Independent Variables

The questionnaire consists of questions organized into the following sections: personal and professional background; office and practice environment; office duties and responsibilities; work stress and health and well-being. The latter included a checklist of physical symptoms and the CES-D, a 20-item measure of depression.⁸ The measure of work stress was a modified version of a dental work stressor inventory developed by Cooper and collaborators⁹ for use among general dental practitioners. Only those items applicable to Canadian dental assistants were used.¹⁰ Work stress was also measured by a general question concerning respondents' assessment of overall work-related stress, and ranked from "not at all stressful" to "extremely stressful" and another concerning the number of days that stress was experienced on the job.

Staff turnover was measured by questions regarding length of time at present job, number of years working in dentistry, number of jobs held since working in dentistry, the likelihood of changing jobs within dentistry, the likelihood of changing to a job outside of dentistry, and the act of having looked for a job outside of dentistry within the past year.

TABLE III

Satisfaction sub-scales: Means and standard deviations

Scale*	s.d.	mean	range
1. General satisfaction	2.1	1.2	1-6
2. Income	3.5	1.8	1-6
3. Having to do unpleasant work	12.8	4.8	5-28
4. Quality of patient care in office	7.1	3.5	4-21
5. Praise and recognition	6.1	3.4	2-12
6. Personal and professional growth	12.7	6.0	4-24
7. Skills development at work	8.2	3.6	3-18
8. Assigned responsibilities	10.9	5.0	5-30
9. Staff care for each other	6.7	3.8	3-18
10. Job stress and strain	12.7	4.8	4-24
11. Time pressure	8.3	3.8	3-18

* Low scores indicate high satisfaction

Results

Response

The response to the survey is given in **Table II**. Thirty-eight subjects were no longer working as dental assistants, leaving an eligible sample size of 962. The 781 questionnaires completed and returned represent a response rate of 81.3 per cent.

Characteristics of Subjects

Of those returning completed questionnaires, only four were male and only 9.5 per cent were over 40. The mean age was 29 years ($sd=8$). Fifty-eight per cent were married and 29.3 per cent had children under 15 years living at home. Not surprisingly, given the sampling frame, only 15 per cent had been trained on the job, the vast majority receiving their training either in a community college or the armed forces. All respondents were certified or certification eligible.

Of the dentists with whom the respondents worked, 20 per cent were specialists, only 6.4 per cent were female, 54.9 per cent were solo practitioners and 67 per cent used more than one chair at a time. Respondents reported their primary office functions to be: receptionist (10.8 per cent), chairside (53.4 per cent), combined reception and chairside (26.9 per cent), and other duties such as public health education (9.9 per cent).

Fifty per cent of respondents had worked in dentistry for five years or less; 25 per cent had been in their practice for one year or less. Most respondents (73.9 per cent) had worked in more than one dental practice during the course of their careers and 6.5 per cent currently worked in more than one dental practice. Most (67 per cent) worked 40 hours or less per week.

When asked about their career aspirations, given the opportunity and the financial ability, 56.8 per cent said they would like to train as a dental hygienist, 6.8 per cent as a dentist and 17.2 per cent would prefer a career outside of dentistry. Only 12.2 per cent indicated that they were happy with what they are doing now.

Job Satisfaction

To the general question on overall satisfaction, 36.7 per cent scored in the "very satisfied" category. Only 11.9 per cent

* These correspond to Chapko et al., respectively, as follows: Non-patient tasks; Recognition; Opportunity to develop professionally; Time to develop professionally; Responsibility; Staff relations; Quality of care; Fatigue; Time pressure. One subscale, Leisure time, was not used because of unsatisfactory internal consistency reliability with this sample.

TABLE IV

Correlations of satisfaction scales with work stress and number of days stressed

Stressed	Stress	Days
1. Having to do unpleasant work	.335	.365
2. Quality of patient care in office	.187	.211
3. Praise and recognition	.325	.352
4. Personal and professional growth	.245	.289
5. Skills development at work	.268	.273
6. Assigned responsibilities	.217	.234
7. Positive staff relations	.216	.236
8. Job stress and strain	.500	.493
9. Time pressure	.364	.374

were moderately or very dissatisfied. The response to the general question indicates a high level of overall satisfaction. This was significantly related to all of the measures of satisfaction ($p < .0001$). Means, standard deviations and ranges for all satisfaction subscales are listed in **Table III**.

Satisfaction with the single item income question was fairly evenly distributed, the largest responses falling into the moderately satisfied (22.7 per cent) and very dissatisfied (20.6 per cent) categories. Furthermore, almost half (47.9 per cent) of the respondents indicated that they were very dissatisfied with OHIP and other benefits. The means of the satisfaction sub-scales showed either moderate satisfaction or an even distribution between satisfaction and dissatisfaction. Sub-scales in which the means indicated satisfaction were: "Assigned responsibilities", "Positive staff relations", "Quality of patient care" and "Time pressures". Sub-scales in which the means indicated neither satisfaction nor dissatisfaction were: "Praise and recognition", "Personal and professional development", "Skills development", "Unpleasant work" and "Job stress and strain". Satisfaction sub-scales were also correlated with measures of work stress and staff turnover.

TABLE V

Correlations of sub-scales with intention to seek a new dental assisting job in a different dental office, a non-dental job and having already looked for a new job.

	New Dental	Non-dental	Have already looked
1. Having to do unpleasant work	-.278	-.229	-.167
2. Quality of patient care in office	-.328	-.222	-.201
3. Praise and recognition	-.391	-.293	-.239
4. Personal and professional growth	-.267	-.401	-.245
5. Skills development at work	-.291	-.297	-.210
6. Assigned responsibilities	-.300	-.308	-.216
7. Positive staff relations	-.305	-.217	-.169
8. Job stress and strain	-.259	-.242	-.190
9. Time pressure	-.255	-.176	-.146

Work stress

In response to the general question about job stress, over half reported that their jobs were at least moderately stressful and 14.5 per cent categorized their jobs as very or extremely stressful. The majority (85.7 per cent) reported that they were bothered by stress on at least one day during the week, while 31.1 per cent were bothered by stress on three or more days. All measures of satisfaction were significantly related to the measures of stress that were used with probabilities less than .00001. See **Table IV** for a summary of correlations. "Job stress and strain" was the measure of satisfaction that most highly related to all of the measures of stress ($r = .500$), followed by "Time pressure" ($r = .364$) and "Unpleasant work" ($r = .325$). These findings indicate that job dissatisfaction, especially with aspects of work that cause fatigue, increases as work stress increases.

Turnover

Almost a fifth (16.7 per cent) of respondents said that it was very likely that they would look for a new assisting job within the next year and 10.8 per cent said it was very likely that they would seek a job outside of dentistry. When the two responses were combined, 22.8 per cent intended to leave their current job. In addition, 16.9 per cent reported having already tried to find a job outside dentistry in the previous year. The intent to change jobs was strongly related to all measures of job satisfaction. Of those intending to seek a new job within dentistry within the next year, dissatisfaction with recognition for work done was the most influential ($r = -.391$), followed by concerns regarding the quality of care delivered ($r = -.318$) and staff relations ($r = -.305$). Assistants seeking new work

outside of dentistry were most influenced by dissatisfaction with the opportunity for "Personal and professional development" ($r = -.401$), followed by the amount of responsibility ($r = -.308$) and the time to develop professionally ($r = -.297$). Respondents who had looked for a new job outside of dentistry within the past year were motivated by dissatisfaction with the opportunity to develop professionally ($r = -.245$), and recognition ($r = -.239$). In relation to stress, among those reporting that their job was very or extremely stressful, 43 per cent said it was very likely that they would look for new work, while of those reporting little or no stress, only 9 per cent indicated this intent (Table V).

Discussion

The measures of job satisfaction were taken, with only minor adaptation, from a study of dental auxiliaries' satisfaction in Washington State.⁷ Their applicability to a large sample of Ontario dental assistants is an indication of reliability of the measures used. That the intent to change jobs is strongly related to the measures of satisfaction also strengthens the reliability of the measures.

Given the relatively short average tenure of dental assistants in one practice, it is perhaps not surprising that the level of general satisfaction is high — those who are dissatisfied leave their job. This interpretation is partly corroborated by the finding that older assistants and those who have been in one practice longer are more satisfied with their employment income, but staying in one job with annual increments would also mean a higher salary. Since most of the assistants surveyed had been trained in formal programs, their loss to dentistry signals a loss not only to the practices in which they are employed but to the public in costs of training.

Other studies, all of them American, which have attempted to estimate the magnitude of dental auxiliary turnover have produced varying results. A 1971 survey of dental assistants in California suggested a turnover rate of 83 per cent per annum,¹¹ while a more recent survey estimated a 20 per cent rate for a six month period.¹² A more systematic longitudinal study, albeit of only 13 dental offices, found that all offices experienced turnover, with rates ranging from 13 per cent to 133 per cent. Overall, 26 per cent of the positions experienced turnover and 48 per cent of all auxiliaries left within the year. The difference between these rates indicates that some positions experienced multiple turnovers during the

study year.¹ A 1986 survey of dental practices in the U.S. found the average tenure of dental assistants to be 4.1 years.¹² Although the above estimates are in excess of the present data, it is clear that work stress and job dissatisfaction nevertheless result in a loss to Ontario dental practices.

Reasons for job leaving may signal deficiencies in office relations. Although dental assistants seeking employment in other dental offices cited lack of recognition as their main reason, dissatisfaction with the quality of care given in the practice was a close second. These findings would appear to indicate that these people are dedicated to high quality dentistry, seeking an environment in which their talents can be put to greater use. Those intending to leave dentistry altogether point to inadequate opportunities for growth. Although whether too much or too little responsibility is the source of dissatisfaction cannot be proven, the inclusion of items like "the opportunity to be helpful to patients" and "the opportunity to use your skills, training and talents to the fullest" in the sub-scale and the fact that the item with the highest factor score was "the variety of things to do in the office", all indicate that dental assistants in Ontario are concerned with having enough responsibility and not that they have too much. Reasons for changing jobs for both these groups are within the realm of improving self-esteem.

The underlying reasons for the loss of these assistants may be inherent limitations of the position, but failure of dentists to utilize their auxiliaries' skills optimally within the legal boundaries of dental assisting may be an important cause. Also, those desiring greater personal and professional growth may be among the more advantageous to the dental team. Their loss to dentistry through frustration is therefore all the greater.

Stress was not related to satisfaction in the same way as intention to change jobs. Studies of job satisfaction in relation to health have emphasized that stressful work in a job that is intrinsically satisfying is less associated with harmful effects than dissatisfying work. Although general stress was strongly related to the firm intention to leave, the relationship to satisfaction may indicate that if given adequate opportunities for professional growth in a supportive environment, dental assistants would be willing to deal with fatigue, time pressure and stress in the professional performance of their work. Δ

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Specialty Features

Dental Hygienist Supply: Workforce Patterns and Trends

Patricia M. Johnson, RDH, PhD

What proportion of dental hygienists are in the workforce? How many work full-time? What influences their decision to work more or less time? With the apparent shortage of dental hygienists and the need to plan future service requirements, these questions are of increasing interest.

This paper presents an overview of findings from a recent study of dental hygienists.^{1,2,3} The major source of data was a national two-part mail survey undertaken in 1987 – a population census (N=5479) and a more detailed provincially-stratified probability subsample (N=2561); response rates (RR) were exceptionally high – 89 per cent and 86 per cent respectively. Trends are examined using information from a series of since-discontinued census surveys conducted by Statistics Canada (RR ranged from 71 per cent to 89 per cent).⁴ Findings are compared to those for registered nurses⁵ and women in general⁶ in Canada. The terms work and workforce refer to employment in dental hygiene.

The Issue

Dental hygienists in Canada increased dramatically over the period 1968 to 1988, both in numbers – from 544 to 7369, and as a proportion of the population – from 1:16,637 to 1:3,501^{7,8}; the dental hygienist to dentist ratio increased from 1:13 to 1:2.⁸ (Stats 1989) However, reports of an undersupply persist. While most reports are anecdotal, a 1987 survey of health and social service employers in Alberta found that, of 81 categories of personnel, dental hygiene was the occupation with the highest vacancy rate.⁹

Planning the appropriate numbers, mix and management of oral health personnel is a complex process that has social and political-economic overtones. Dental hygienist planning is confounded by population-based demographic and epidemiologic changes and uncertainty over service need and demand; shifting employment patterns among females, accompanied by fundamental changes in family structure, finances and consumption and in employment legislation; the



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reported oversupply of dentists, with its implications for dental hygienist employment opportunities; increasing emphasis on cost containment, especially in the public sector, together with the inherent concepts of technical efficiency (which implies provision of services by the least-trained person) and public-interest-determined health goals and service requirements; and, not least, lack of

information on service providers.

Numbers and Distribution

The overall distribution of dental hygienists (see Figure 1) is consistent with that of the Canadian population. In 1987, over 60 per cent resided in Ontario or Quebec. Compared to the general population, survey respondents were disproportionately higher for Ontario (that is, 44.3 per cent resided in Ontario compared to 36.4 per cent of Canada's population) and lower for Newfoundland, New Brunswick, and Saskatchewan.

Over the period 1976 to 1987, absolute numbers of dental hygienists increased for all regions; however, a slight shift in proportional distribution – that is, "share" of the potential workforce – occurred. The Atlantic and Prairie provinces and British Columbia steadily lost whereas Quebec and Ontario, with a combined increase of 17.7 per cent, gained.

The growth in numbers and shift in distribution are related to an increase in educational programs. In 1987, four out of five respondents graduated after 1974 – 68.4 per cent from programs in Ontario or Quebec. In contrast, immigration has been low – only 4.0 per cent graduated outside Canada.



There has been little inter-provincial or territorial migration within the supply pool. In 1987, the proportion of respondents residing in the province in which they first registered as a dental hygienist ranged from 78.1 per cent for Nova Scotia to 94.0 per cent for Ontario and Quebec. When movement occurred, Ontario most often was the province of choice for the Atlantic region; movement for the western provinces was slighter and primarily intra-regional.

Population Profile

Characteristics of an occupational group are associated with workforce behaviour. Among women, in particular, employment patterns are subject to the dual roles of household and paid work.

Dental hygienists are predominantly female (98.4 per cent) and relatively youthful (mean age = 31.2 years). Almost three-quarters (71.5 per cent) of respondents were married. Slightly less than one-half (44.6 per cent) reported the presence of a dependent (a person in the home requiring assistance with activities of daily living). Of respondents with dependents, the majority (68.1 per cent) reported at least one child less than five years old. Family size tended to be small, with one or two dependents (84.8 per cent).

The population changed over the period 1977 to 1987. While the potential workforce remained predominately female, it was aging. Mean age increased from 28 to 31 years; the proportion under 30 years of age declined from 68.0 per cent to 44.4 per cent. The married proportion increased from 61.3 per cent to 71.5 per cent. The proportion reporting the presence of dependent children increased from 25.9 per cent to 44.6 per cent.

By 1987, the majority (56.6 per cent) had graduated from a college-based dental hygiene program. Few respondents (19.0 per cent) held academic qualifications beyond their basic dental hygiene diploma. The vast majority were licensed to practice in only one province or territory (89.8 per cent).

Workforce Patterns and Trends

Two dimensions of workforce behaviour are of interest for labour supply analysis — participation (which refers to the number of qualified people working for pay or profit, seeking work or on leave or layoff) and time worked (by those employed).¹⁰

Participation

In 1987, participation in the dental hygiene workforce was remarkably high — 88.7 per cent. As illustrated in Figure 2, the vast majority of respond-

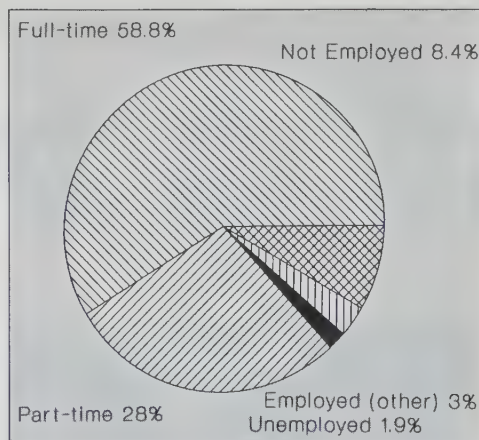


Fig. 2. Dental Hygienists, by Employment Status, Canada, 1987. Per cent (N=5399).

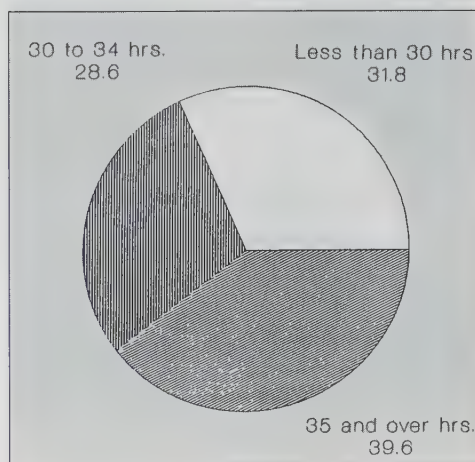


Fig. 3. Employed Dental Hygienists, by Total Number of Hours Worked Per Week on Average in Dental Hygiene, Canada, 1987. Per cent (N=4672).

ents (86.8 per cent) were employed — either full-time (30 hours or more, lunch period excluded) or part-time. Another 1.9 per cent were unemployed (that is, seeking work or on leave). (An unemployment rate of 5 per cent or less is one indicator of a tight labour market.¹¹) Respondents who did not participate (that is, were not employed) comprised two categories — those engaged in non-paid activities and those employed solely in another field and unavailable for work.

Participation was lowest for Prince Edward Island (69.6 per cent) and Saskatchewan (77.5 per cent) and exceeded 90.0 per cent for the territories, Newfoundland, New Brunswick and Ontario. Younger-aged dental hygienists (20 to 29 years) had the highest rate of participation (97.9 per cent). Of women in the later child-rearing years (30 to 39 years), 85.8 per cent were active. Compared to younger age groups, dental hygienists 40 years and over were more often likely to be employed in another field. While those aged 55 years and older were most likely to be out of the labour force, 52.3 per cent were working full-time in dental hygiene. Presence of a child

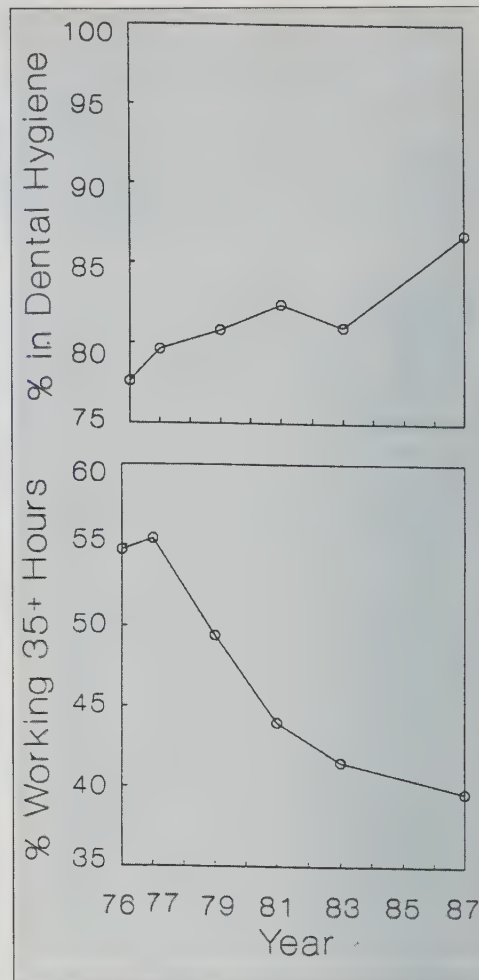


Fig. 4. Dental hygienist employment status for selected years, 1976 to 1987: (A) percentage working in dental hygiene and (B) percentage working 35 and more hours per week, Canada.

under five years of age did not preclude participation; four out of five worked in dental hygiene.

In 1987, employment among dental hygienists (86.8) exceeded the rate for women in general (51.2), but was slightly less than for registered nurses (89.4).

Time Worked

In 1987, employed dental hygienists worked on average 30.3 (± 9) hours per week (totalled across up to three workplaces); one-half worked 32 or more hours; 35 hours per week was reported most frequently (see Figure 3). They worked an average of 50 weeks in the past 12 months.

Little regional variation was noted for time worked. Dental hygienists 35 years of age and over worked disproportionately fewer hours. Presence of a child under five years of age or three or more dependents did not markedly limit hours worked. Those with a very young child worked just over 24 hours per week on average and those with three or more dependents worked almost 23 hours.

Trends

Over the period 1976 to 1987 and consistent with trends among married women in general, the dental hygiene employment rate increased steadily (see Figure 4a). That gain in labour supply was due to a decline in the "not employed" group – the proportion working outside dental hygiene remained relatively constant.

The gain was offset by a decline in hours worked per week, in particular among those with no dependents. The proportion working 35 or more hours declined from 55.1 per cent to 39.6 per cent (see Figure 4b). The number of weeks worked per year remained stable. The decline in hours worked is consistent with a general decrease in work week length¹²; however, dental hygienists tend to work fewer hours than registered nurses and women in general.

Factors Influencing Hours Worked

Factors associated with hours worked per week on average by employed female dental hygienists were identified using multiple linear regression procedures ($p \leq .05$).

Factors influencing hours worked by the married group were similar to those for other employed women. In order of importance, they were work history (those who worked full-time in the past 18 months worked more hours than their counterparts who had not); wage rate, presence of a child under five years of age, and non-dental-hygiene household income – each had a negative effect; region of residence (the person 25 to 34 years of age living in Quebec worked on average fewer hours than her Ontario counterpart); type of workplace (a decrease would result with a change from the public sector to a private dental practice), and presence of dependents five years of age and over – the last two had minimal effects.

For non-married dental hygienists, important influences were work history, career satisfaction (the person either extremely or very satisfied worked more hours on average than her ambivalent or dissatisfied counterpart), residing in Quebec or British Columbia versus Ontario (a negative influence), educational attainment (the person qualified in addition to basic dental hygiene worked more hours), and type of workplace.

Career and Job Satisfaction

The importance of career satisfaction to workforce behaviour is noteworthy. As illustrated in Figure 5, dental hygienists

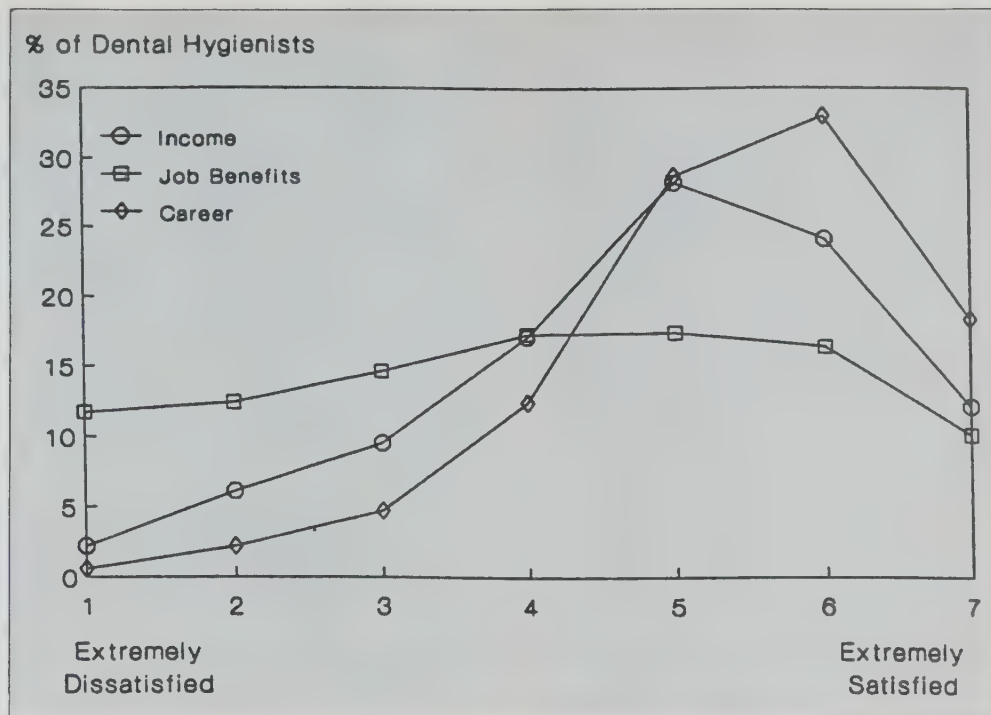


Fig. 5. Dental hygienists employed in dental hygiene, by level of satisfaction with wage income, employment benefits, and career, Canada, 1987. (N=2396).

tend to be very satisfied with their careers in dental hygiene, moderately satisfied with their wage income, and ambivalent about benefits received.

Of respondents' written comments regarding their jobs and careers, more expressed dissatisfaction. Topics cited primarily concerned workplace organizational structures (for example, lack of professional respect, decision-making responsibility, and merit-based remuneration), regulatory control of the occupation (for example, limits on professional autonomy and scope of practice), and lack of opportunity for personal growth and career advancement. Thus occupational and workplace structures are of interest in planning labour supply.

Dental Hygiene Work

The majority of dental hygienists have a single workplace (76.3 per cent), typically a private general dental practice (74.8 per cent). In terms of the principal workplace (the one at which they spend most time), private dental practice was proportionately higher for Ontario and British Columbia; public health was highest for Quebec. (See Figure 6.)

Over the period 1976 to 1987 and consistent with trends among dentists, the private dental practice increased disproportionately in its share of the dental hygiene workforce – from 74.9 per cent to 85.4 per cent. (Absolute numbers increased for all workplace categories).

The major work activity of dental hygienists (the one at which they spend

the most time) is provision of clinical services. The distribution does not vary markedly by region, school or year of graduation or over time, but does by type of workplace – for example, clinical activities are disproportionately greater in the private dental office and armed forces.

Work supervision varied by region, consistent with provincial practice regulations. Direct supervision (whereby a dentist is present and authorizes and evaluates the work) was reported by 48.3 per cent of respondents, ranging from a high of 64.6 per cent for Ontario to a low of 17.4 per cent for British Columbia. General supervision (work authorization) was highest for British Columbia (36.9 per cent) and Quebec (25.5 per cent) and lowest for Ontario (3.5 per cent).

Remuneration varied by region and type of workplace. The mean hourly wage rate in 1987 was \$20.21, with a high of \$23.78 for British Columbia and low of \$13.26 for Quebec; it was higher in private versus public sector workplaces. The remuneration structure may be a disincentive for dental hygienists to remain in the field after reaching the maximum pay level, to work full- versus part-time, or to accept employment in "difficult" areas such as hospitals. Wage differentials based on years of experience, job tenure or hours worked per week were not apparent. Standard employment and job security benefits were markedly lower for the private dental practice workplace.

Myths and Stereotypes

Myth #1

The findings help to dispel the myth that workforce attrition is high. The vast majority (88.7 per cent) of dental hygienists registered to practice and living in Canada are working or available for work. They tend to be active for a considerable length of time; given that the predominantly female workforce is subject to the dual demands of household and paid work and that the increased numbers of graduates in recent years exert a downward pull, 69.1 per cent worked in dental hygiene for five or more years.

Of the group who are not working, most have withdrawn temporarily to care for children. Very few are retired, just over 3.0 per cent are working outside the field, and approximately 7.0 per cent are permanently inactive (five years or more, with no intention of returning). With few exceptions, inactive dental hygienists maintain a license to practice — a requirement for workforce re-entry.

Myth #2

A second myth dispelled is that there is a large pool of inactive dental hygienists who might be pulled back into the workforce. In 1987, the inactive pool constituted just over 8.0 per cent of the population. Of that group, the majority had at least one very young child at home.

Myth #3

The findings also dispel the myth that the workforce is unstable. As noted, there has been very little inter-provincial migration. In 1987, dental hygienists who worked tended to work at least 50 weeks per year, rather than seasonally. One-half had not changed jobs in the previous three-year period.

Myth #4

There is a perception that remuneration for dental hygienists is relatively high. The 1987 remuneration package for dental hygienists consisted almost entirely of the wage portion; the vast majority did not receive standard employment benefits. Similar findings were reported for Canada¹³ and British Columbia¹⁴. The employment benefit portion typically amounts to 14 per cent or more for registered nurses working in the hospital sector and 16 per cent to 20 per cent in other industries. When used for comparison purposes, estimates of dental hygiene earnings should be adjusted downwards by a factor of at least 10 per cent (allowing for statutory holiday pay).

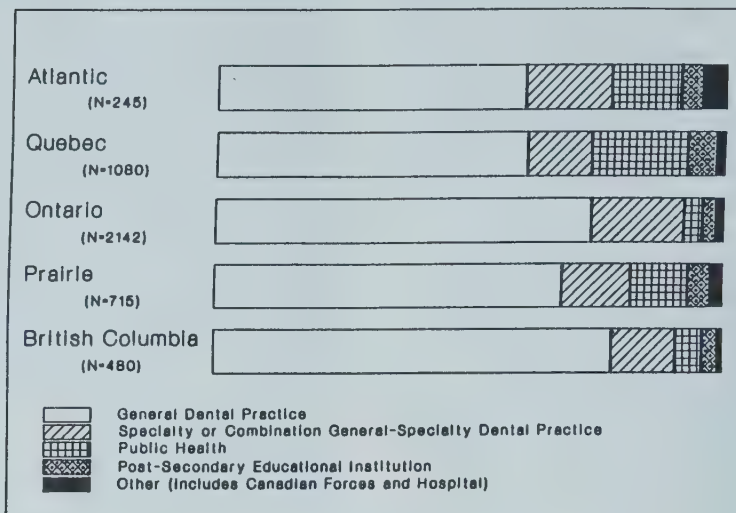


Fig. 6. Principle dental hygiene workplace, by type and region, Canada, 1987. (N=4662).

Supply Options

The increasingly high rate of employment among women in general and dental hygienists in particular suggests a decline in participation among the current pool is unlikely, at least in the short run. On the other hand, gains in employment may be offset by an increasing decline in total hours worked and a shift to other occupations as the supply pool ages.

Several options are available to alleviate a shortage. First, the absolute number of dental hygienists may be increased by extending the number of educational programs and/or the number of students enrolled in existing programs, and increasing immigration. These approaches are subject to regulations controlling entry to practice and macroeconomic factors that influence the choice of dental hygiene over other occupations and of one location over another.

Alternatively, measures could be undertaken to increase, in particular, hours worked among the existing workforce; participation already is high. Strategies to address quality-of-work-life issues include wage and benefit packages to improve income security, decompression of pay schedules between new graduates and those with more experience, and work enrichment measures. For the group with child-care responsibilities, the prevalence of part-time employment indicates that flexible work hours already exist. However, workplace-located day-care is less feasible due to the predominance of the solo dental practice workplace.

A third option is to reduce demand and enhance efficiency. Strategies include limiting procedures that are not cost-effective and substituting alternate types of personnel consistent with service standards. This approach requires educational and regulatory changes and funding incentives to modify practice behaviour. In the short-run, use of lesser-trained personnel may increase the availability of services; however, many of those services have been shown to be of little health benefit (for example, routine radiographs and professional tooth polishing).¹⁵ A longer-term consequence may be a reduction and even change in the dental hygiene applicant pool, leading in turn to a constraint for dentists who wish to incorporate into their practices technology involving knowledge and expertise typically expected of the dental hygienist (for example, chemotherapeutic plaque control and preventive maintenance regimes for an aging and increasingly dentally aware clientele). Cost-effectiveness and scopes of practice are of heightened interest to public decision-makers and consumer as well as professional groups.

The final option is to do nothing. This approach includes monitoring practitioner and population-based trends and changes for indications of improved balance between service supply and requirements.

In summary, the high rate of labour force participation and time worked among dental hygienists, coupled with the low rate of unemployment and small

inactive pool, indicate an expansion in the numbers of new entrants to the profession and/or an increase in time worked by the active pool would be required to alleviate a shortage. To increase both hours worked and retention of middle and older-aged practitioners, quality-of-work-life factors should be examined. Professional organizations and government agencies, as well as consumers, employers and dental hygienists have a stake in ensuring that occupational and workplace policies provide incentives to work. Δ

Acknowledgements

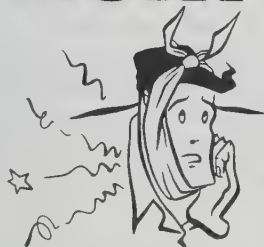
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The major epulides: clinicopathological correlations

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G.P. Wysocki, DDS, PhD
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ABSTRACT

The word "epulis" is a clinical term used to describe a localized growth on the gingiva. Histologic examination of epulides indicates that the vast majority are focal fibrous hyperplasias, peripheral ossifying fibromas, pyogenic granulomas or peripheral giant cell granulomas. Data, derived from a 12-year retrospective study of gingival lesions submitted to the Oral Pathology Diagnostic Service at The University of Western Ontario, are the subject of this paper. The results indicate that the major epulides are common oral lesions with which dentists should be thoroughly familiar. The histologic features and clinical relevance of these lesions are examined and analyzed and their biological and clinical behavior are discussed.

SOMMAIRE

Introduction

"Epulis" is a nonspecific term applied to tumors and tumor-like masses of the gingiva.¹ Specifically, it is a clinical term used to describe subepithelial tumefactions of the gingiva or alveolar ridge mucosa, with or without ulceration. Therefore, lesions occurring on the gingiva but exhibiting distinct epithelial changes, such as verruca vulgaris, papilloma, and primary squamous cell carcinoma, are technically not epulides. On the other hand, odontogenic tumors such as the peripheral ameloblastoma² and odontogenic cysts such as the gingival cyst of the adult³ occur on the gingiva and appear clinically as epulides. Benign connective tissue neoplasms such as neurofibromas, neurilemmomas⁴ and leiomyomas⁵ may occasionally present as epulides. Malignant epulides are, fortunately, rarely encountered. Occasionally, diseases such as amyloidosis⁶ hyaline cutis et mucosae⁶ and Crohn's disease may present as focal subepithelial deposits of extracellular material or



Fig. 1 a). The pale, tear-drop shaped mass of the interdental papilla between the mandibular cuspid and lateral incisor was a focal fibrous hyperplasia. The pale colour is caused by the relatively large amount of collagen and poor vascularity.

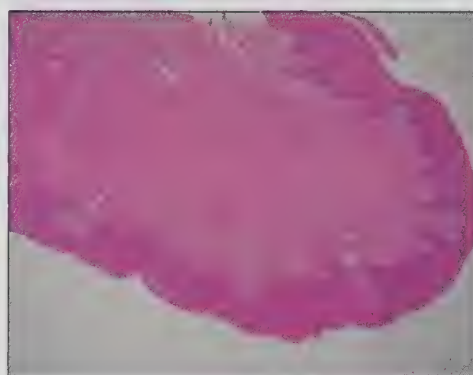
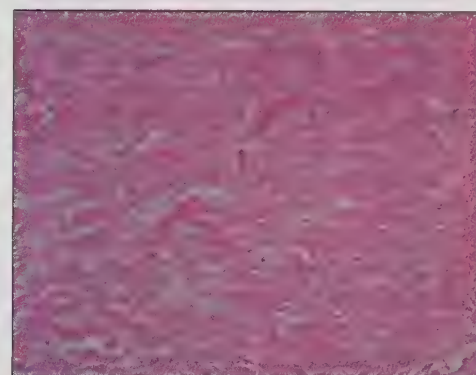


Fig. 2 a). Focal Fibrous Hyperplasia: At low magnification, the FFH appears as a sessile nodule consisting of a central mass of dense connective tissue covered by a layer of epithelium on three sides. (Hematoxylin and eosin, Original Mag X6)

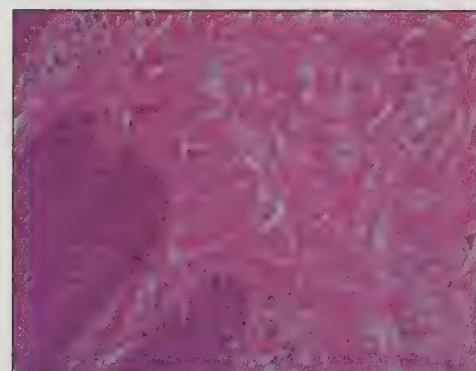
inflammatory infiltrate in the gingiva, forming epulides. Primarily, however, epulides represent reactive hyperplasias of connective tissue cells of the gingiva or superficial periodontal ligament.^{2,7,8} These common epulides are: 1) the focal fibrous hyperplasia (FFH), commonly termed "fibroma"; 2) the peripheral ossifying fibroma (POF); 3) the pyogenic granuloma (PyG) and 4) the peripheral giant cell granuloma (PGCG). These four lesions comprise the major epulides. This paper reviews the clinical and histological features of these lesions and discusses their biological and clinical behavior. Epidemiologic data derived from a 12-year retrospective study are reported.



b). The red mass distal to the maxillary cuspid was a pyogenic granuloma with focal ulceration where the lesion contacts the cuspid. The redness is caused by the extreme vascularity of these lesions. Peripheral giant cell granulomas look similar clinically.



b). FFH: Higher magnification of the central area reveals dense collagenous bundles containing thin, spindle-shaped fibroblasts and occasional blood vessels. (Hematoxylin and eosin, Original Mag X62.5)



c). FFH: A variant of FFH, the giant cell fibroma exhibits plump, stellate and occasionally multinucleated fibroblasts in the typical dense collagenous stroma. (Hematoxylin and eosin, Mag X62.5)

Materials and Methods

All major epulides (Figs. 1a,b) examined by oral pathologists of the Oral Pathology Diagnostic Service, The University of Western Ontario, London, Ontario, between the years 1976 and 1987, inclusive, were reviewed. Data regarding site of the lesion and sex and age of the affected patient at the time of excision were recorded. Histologic diagnoses were defined as follows:

- a) FFH: a focal subepithelial mass of dense fibrous connective tissue composed of interlacing or parallel bundles of collagen, containing occasional vascular channels and variable inflammatory infiltrate. The fibroblasts are typically narrow and elongated, and relatively few in number (Figs. 2a,b). In some cases a typical ulcer bed is associated with ulcerated overlying stratified squamous epithelium. The term "FFH" implies a reactive tissue response and is therefore preferable to the term "fibroma" which implies, incorrectly, a benign neoplastic proliferation of fibrous connective tissue. Nevertheless, the term "fibroma" is widely used, especially with regard to variants. For example, the "fibroma molle" (soft fibroma) contains a considerable amount of ground substance and less collagen and the "giant cell fibroma" exhibits plump, stellate and sometimes multinucleated fibroblasts in the collagenous stroma (Fig. 2c).
- b) POF: a cellular mass of plump fibroblasts in a diffuse, sparsely fibrous background usually containing amorphous droplet calcifications and/or bone formation within the stroma (Fig. 3a,b). Osteoblastic rimming is often absent. The lesion contains some vascular channels and is covered by stratified squamous epithelium that is often ulcerated. A typically cellular area in a lesion that otherwise resembles a fibroma is sufficient for the diagnosis.
- c) PyG: a mass of tissue characterized by a marked proliferation of vascular channels, supported by varying amounts of fibrous connective tissue (Figs 4a,b) and often exhibiting ulceration of the overlying epithelium, with an associated subacute inflammatory infiltrate. As the lesion ages, the degree of fibrosis may increase until the lesion begins to resemble an FFH. In lesions which exhibit features of POF and/or PGCG, the diagnosis is based on the predominant histologic pattern.
- d) PGCG: a focal subepithelial collection of multinucleated giant cells in a



Fig. 3 a). *Peripheral Ossifying Fibroma: Even at this low magnification, the presence of calcified tissue can be seen as irregular dark pink masses within an exophytic growth that exhibits extensive surface ulceration. (Hematoxylin and eosin, Original mag X6)*

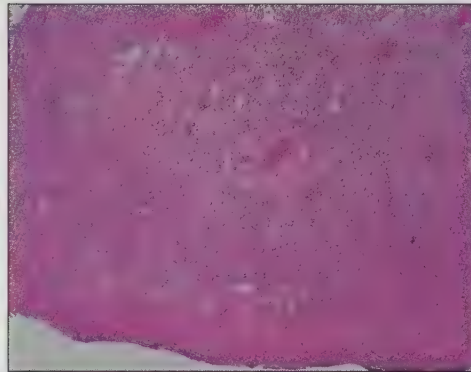


Fig. 4 a). *Pyogenic Granuloma: Even at low magnification, the large number of blood vessels is apparent in this photomicrograph of an ulcerated epulis that bled easily when probed clinically. (Hematoxylin and eosin, Original max X15)*

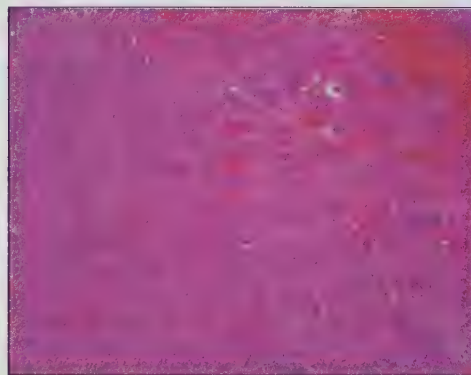
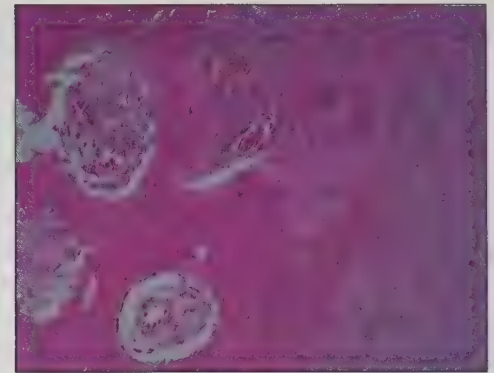


Fig. 5 a). *Peripheral Giant Cell Granuloma: At this magnification, giant cells are seen at numerous purple irregular spots in a pink cellular and hemorrhagic background (Hematoxylin and eosin, Original mag X25)*

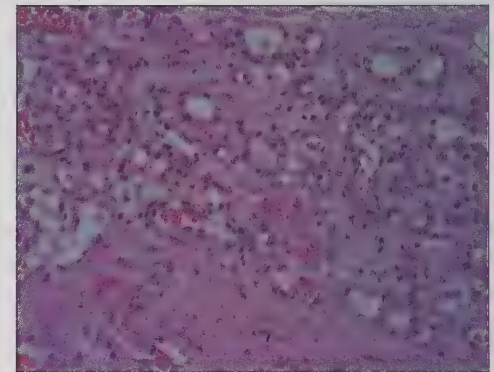
highly cellular, vascular, collagen-poor stroma (Figs. 5a,b). The lesional tissue is typically separated from the overlying stratified squamous epithelium by a fibrous zone.

Results

In the 12 year interval (1976-87), 1,298 major epulides were examined from a total biopsy load of 20,228 cases



b). *POF: The left side of this photomicrograph illustrates the typical cellularity and lack of collagen which distinguishes the POF from the FFH (compare Fig. 2 b). The right side illustrates the bone which forms directly from the cellular stroma. (Hematoxylin and eosin, Original mag X62.5)*



b). *PyG: Higher magnification reveals a predominance of endothelial-lined vascular spaces, containing red blood cells in a sparsely collagenous stroma. (Hematoxylin and eosin, Original mag X62.5)*



b). *PGCG: Higher magnification illustrates the typical multinucleated giant cells in the cellular stroma. (Hematoxylin and eosin, Original mag X62.5).*

(6.42 per cent). Of these, 794 (61.2 per cent) were FFHs, 283 (21.8 per cent) were POFs, 154 (11.9 per cent) were PyGs and 67 (5.1 per cent) were PGCGs. Fig. 6 illustrates the number of the major epulides with respect to age of the patients at the time of treatment. Fig. 7 illustrates the sex differences in the major epulides diagnosed. Fig. 8 represents the annual number of major epulides as a percentage of the annual surgical load.

Discussion

The epulides are common oral lesions relative to other mucosal tissues submitted to our Biopsy Service. Despite sources of bias, including the fact that some common oral diseases are not biopsied, that general dental practitioners and oral surgeons may be more likely to excise and submit selected types of lesions and that only patients seeking oral health care, largely from dentists, are the sources of these lesions, it can be concluded, based on raw data, that epulides are common. It is, therefore, imperative that all personnel who perform oral examinations be familiar with the clinical features as well as the biological and clinical behavior of each of the four main histologic types of these gingival enlargements.

Clinical Features

An epulis is a localized gingival growth, typically starting in the interdental papilla. The lesions which contain relatively little vascularity (FFH, POF) are pink, smooth surfaced elevations that are usually asymptomatic. Those lesions which contain numerous vascular spaces (PyG, PGCG) are usually red, smooth surfaced elevations. If the lesions reach sufficient size, the degree of trauma to which they are subjected is often sufficient to cause focal ulceration, thus altering the clinical appearance. A yellowish ulcer bed surrounded by an inflamed, red border may cause a fibroma to appear red.

This study indicated that all of the major epulides except the PGCG were more likely to occur in females than in males, especially PyG which exhibited a 2.76 to 1 female predilection. This result is similar to those previously reported;^{7,8} however, unlike Eversole's study,⁷ we found no female predilection for PGCG.

All of the major epulides occurred over a wide age range. The mode for FFH was the fourth decade although there was a wide peak ranging from the second to the sixth decades. These data agree with those of Eversole⁷ and Lee.⁸ The POF occurred more frequently in the second and third decades with a distinct decrease in incidence after 29 years of age. This predilection for young people coincides with the findings of previous studies.^{7,8} PyG was more commonly found in patients in their third decade of life with a definite female predilection, perhaps reflecting the influence of pregnancy, which is more common in this age group. Lee⁸ found a similar clustering of age and sex predilection for this lesion. Initially, our data concerning PGCG appeared to differ from that of Eversole.⁷ However, closer examination revealed concordance of the two

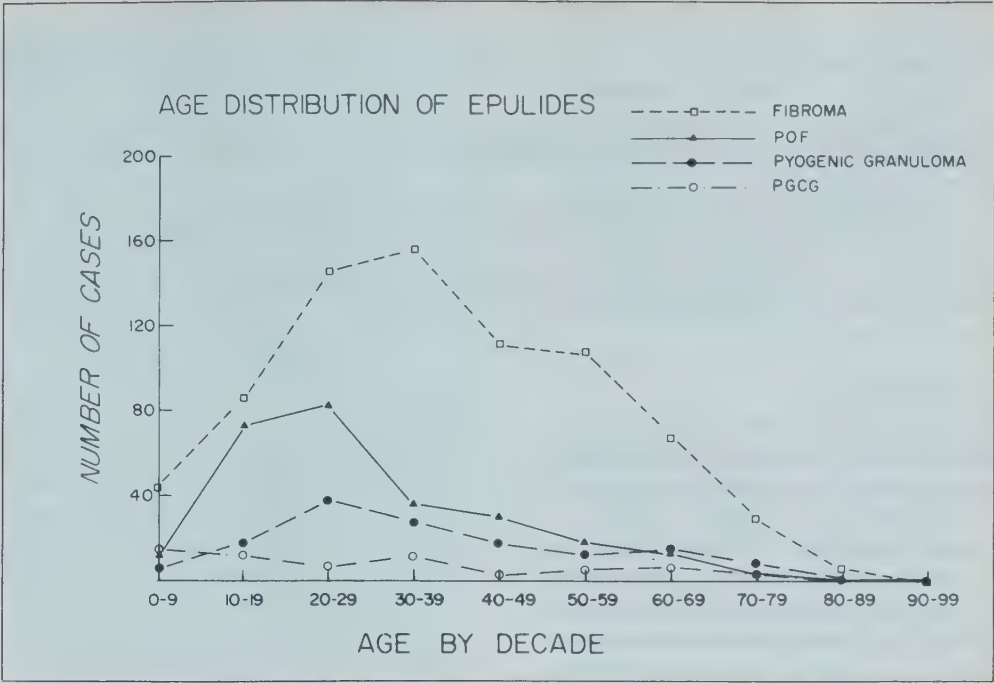


Fig. 6. Age distribution of epulides.

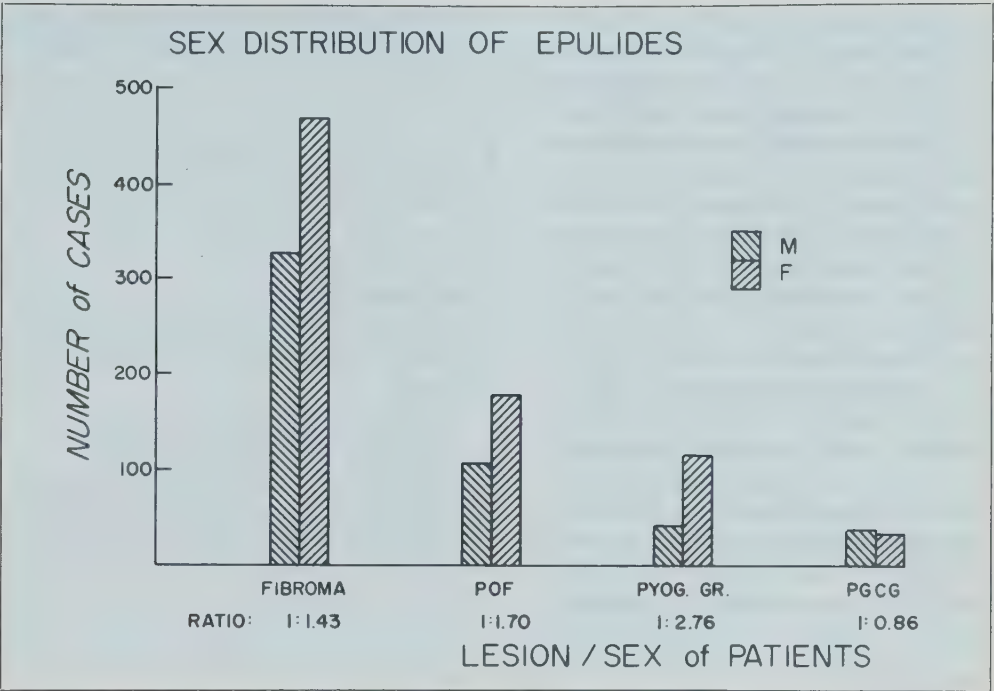


Fig. 7. Sex distribution of epulides.

studies. Our results showed a bimodal peak in the first-second and the fourth decades of life, while Eversole showed a bimodal peak in the second and fourth-fifth decades.

Biologic Behavior

The major epulides are believed to be stimulated by chronic low-grade trauma, such as may be caused by calculus, plaque, orthodontic appliances, partial dentures and poorly placed restorations. Hormonal influences are recognized, at least for the PyG which is sometimes associated with pregnancy (pregnancy tumor), during which multifocal lesions

and occasionally bone invading lesions may occur. Some authors believe that the type of epulis depends on the source of the hyperplastic cells. For example, FFH is believed to arise from the connective tissue of the gingiva, while POF arises from the superficial periodontal ligament which contains cells that may produce bone or cementum. PGCGs arise most frequently in the gingiva anterior to the molars⁷ often in children, suggesting an association with odontoclasts during physiologic tooth resorption. PyG appears hormonally related. These theories are speculative since overlapping lesions are sometimes encountered. For

example, a PyG which is long-standing often undergoes progressive fibrosis, eventually forming a FFH.

Although few of the major epulides grow larger than 1 cm in greatest dimension, most attain a maximum size of less than 1 cm, but persist as long as the stimulus remains, and even in the absence of any apparent stimulus. Surgical excision plus the removal of any apparent source of chronic irritation is the treatment of choice.

Prognosis

The prognosis for these reactive lesions is excellent. Recurrence of FFH is uncommon. Eversole⁷ reported the recurrence rate of POF to be 20 per cent, while Cundiff⁴ reported 16 per cent. The recurrence rate of PyG is variable, depending on the hormonal state of the affected individual. Lee⁸ reported a minimum recurrence rate of 13 per cent. The recurrence rate of PGCG is 11 per cent. Multiple recurrences are possible, especially for POF and PyG.

The percentage of major epulides relative to total surgicals is decreasing slowly in our biopsy diagnostic service. This decrease reflects largely a decrease in the relative number of FFHs which make up the majority of this group. Over the 12-year period, the relative incidence of POFs has also decreased slightly, while the relative incidence of PGCGs has remained more or less stable. Interestingly, the relative incidence of PyGs has increased. The decrease in FFHs and POFs may be related to better oral hygiene, better appliances, and better and fewer restorations in more recent years. The steady incidence of PGCG is expected if the odontoclast-exfoliation theory is followed and the increase in PyG may be related to increased pregnancy rate.⁹

Summary

The four major epulides; FFH, POF, PyG and PGCG have been reviewed with respect to clinical and histologic features, biological behavior and prognosis. Epidemiologic data derived from a survey of the Oral Pathology Diagnostic Service, University of Western Ontario, indicate that age and sex incidence is similar to previously reported series. The relative incidence of most types of epulides appears to be decreasing with time. △

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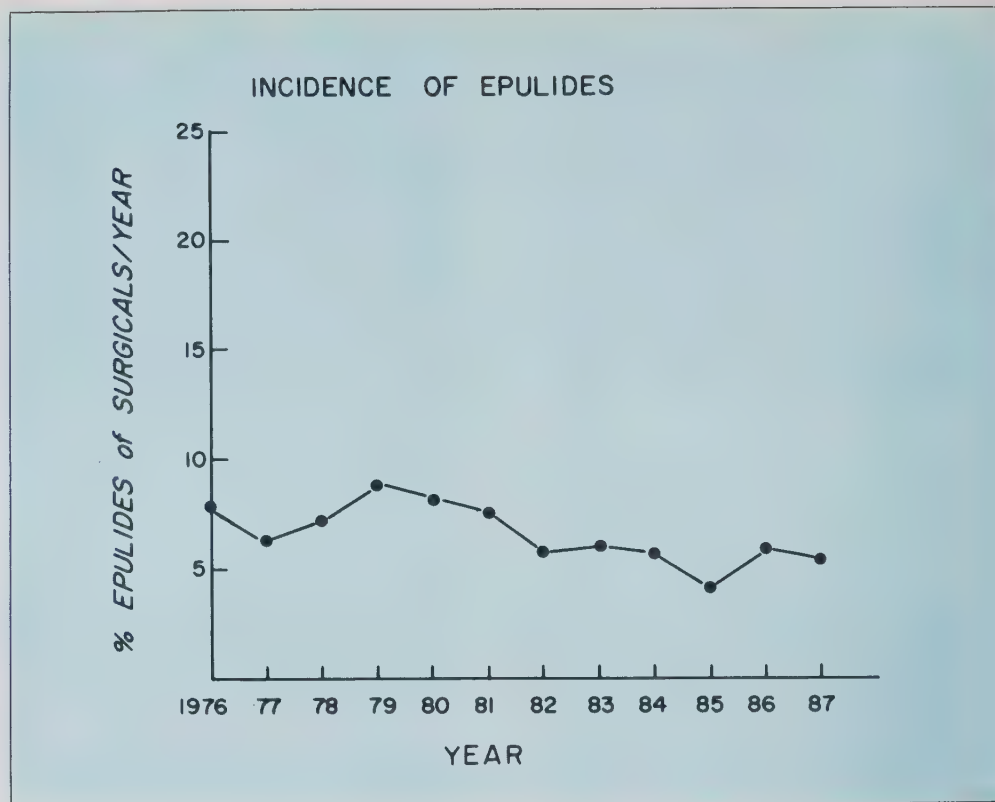


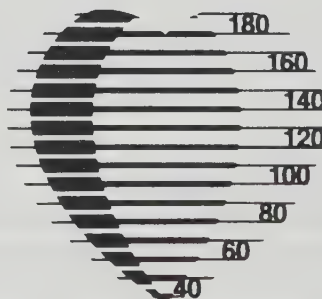
Fig. 8. Incidence of epulides.

P.D. Wysocki and D.M. Wysocki were summer students in the Department of Pathology, University of Western Ontario.

Reprint requests to Dr. Daley.

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KNOW YOUR
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Résistance adhésive à l'émail mordancé de la résine composite directe, de la résine composite indirecte et de la porcelaine mordancée et silanisée

Prévost, A.P.[†], Desautels, P.^{††}
Université de Montréal

RÉSUMÉ

L'adhésion à l'émail mordancé des incrustations de résine composite n'est pas aussi connue que celle des incrustations de porcelaine et que celle des résines composites directes. Cette étude évalue l'adhésion d'une résine composite photo-polymérisable (P-50) utilisée en technique indirecte et polymérisée secondairement par la chaleur. Il ne semble pas y avoir de différences significatives entre l'adhésion du P-50 utilisé en technique indirecte et celle d'une porcelaine (Mirage). Le P-50 utilisé en technique directe nous donne par contre une adhésion nettement moindre que celle des techniques indirectes.

SUMMARY

The adhesion to enamel of composite resin inlays are not documented as much as porcelain inlays and direct composite resins. This study evaluates the adhesion of a light cured composite resin (P-50) used in an indirect technique and secondarily polymerized by heat. No significant differences were found between adhesion of P-50 used with an indirect technique and adhesion of porcelain (Mirage). P-50 used with the direct technique yield adhesion values significantly lower than the indirect techniques.

Introduction

L'aspect esthétique des dents postérieures lors de leur restauration prend une importance grandissante dans la pratique dentaire de tous les jours. Ces restaurations ne sont cependant pas que des restaurations esthétiques; en effet, elles doivent posséder aussi la propriété d'adhérer aux structures dentaires. Cette résistance adhésive se fait principalement entre la résine et l'émail mordancé. Elle est de l'ordre de 20 MPa (3000 psi) sur l'émail humain.

La résistance adhésive à l'émail des résines composites directes est maintenant bien connue. De plus, plusieurs auteurs rapportent que la mise en place de restaurations adhésives en résine composite fournit un renfort à la structure dentaire^{1,2,3,4,5,6}, alors que d'autres^{7,8,9} mettent en doute ce renfort lorsque la résistance adhésive atteint sa limite ultime. Stampalia et al.⁷ suggèrent que la restauration adhésive empêche le déplacement des cuspidés sous les charges répétées de la mastication; tant et aussi longtemps que ces charges ne dépassent pas la résistance ultime de la liaison composite-émail, les cuspidés demeurent à l'abri de la fracture. Sheth et al.¹⁰ soulèvent l'importance de la largeur de la cavité sous ce rapport. Ils rapportent que ce renfort n'est pas significatif lorsque la largeur de la cavité est petite (2 mm) mais qu'il le devient lorsque la cavité est large (4 mm).

Une restauration non adhésive, comme l'amalgame, n'empêche pas le déplacement des cuspidés; par conséquent, suite à des charges répétées, les cuspidés pourraient finir par céder par fatigue, même sous des contraintes minimales. Dans un tel cas, le mécanisme proposé est celui de la propagation d'une fissure engendrée par les multiples déplacements de cette cuspide. C'est donc dire qu'en dedans de la limite où il y a fracture, une restauration adhésive réduit le déplacement des cuspidés les uns des autres. Ceci devrait protéger le scellement périphérique et augmenter la résistance à la récurrence de carie.

Les restaurations de porcelaine mordancée et silanisée ont aussi leurs lettres de créance^{11,12,13,14} en ce qui concerne le renfort apporté à la substance dentaire. Jensen¹¹ a démontré que les incrustations de porcelaine comme les résines composites peuvent apporter un renfort à la

dent et qu'en plus elles offrent un meilleur scellement périphérique que les résines composites. On croit cette supériorité basée sur la plus faible contraction de prise du petit volume de résine composite utilisé lors du scellement, l'incrustation elle-même ayant déjà subi sa contraction de prise en technique indirecte. Ce qui est moins connu demeure la résistance adhésive des incrustations de résine composite. Celles-ci possèdent des avantages certains du simple point de vue matériau puisque la technique indirecte permet une meilleure polymérisation de la résine, ce qui lui confère de meilleures propriétés mécaniques comme une résistance accrue à l'usure^{15,16,17} et à la fracture marginale¹⁸. Côté technique, la contraction de prise d'une résine composite entraîne la formation de contraintes pouvant conduire à une perte d'adhésion^{19,20} et/ou pouvant favoriser une fracture de l'émail^{21,22,23} aux cuspidés qu'elle unit. Cette contraction de prise pourrait aussi favoriser une faiblesse de l'étanchéité tel que rapporté par Jensen et Chan¹².

La technique indirecte permet donc cette contraction de prise sans contrainte sur les cuspidés puisque ce n'est que la résine de scellement qui contracte lors de la mise en place de la restauration, ce qui est fort peu en regard de la contraction obtenue en technique directe. Toutefois, si cette polymérisation accrue améliore les propriétés intrinsèques du matériau, sa capacité à se lier à la résine de scellement en est peut être réduite par le fait qu'il reste beaucoup moins de terminaisons libres à sa surface (insaturation résiduelle). Cette adhésion devient spécialement importante lors de la restauration de dents gravement mutilées où la rétention "conventionnelle" donnée par le dessin de la cavité devient impossible (opposition des parois les uns aux autres). En fait, dans ces situations l'adhérence devient l'unique mode de rétention.

Certaines questions demeurent donc sans réponse:

- Cette "super" polymérisation de la restauration hors de la cavité laisse-t-

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elle suffisamment de liens chimiques disponibles à son intrados pour permettre une adhérence à la résine de scellement?

- Et si oui, cette adhérence est-elle comparable à celle obtenue et reconnue pour les incrustations de porcelaine?
- Les séparateurs utilisés entre la cavité et le matériau de restauration en technique indirecte nuisent-ils à l'adhésion subséquente de ces restaurations à la résine de scellement?
- Par ailleurs certains produits comme le "Scotchprep" de 3M peuvent-ils influencer l'adhésion de la résine de scellement à l'intrados de ces restaurations?
- Ce traitement "Scotchprep" au améliore-t-il de façon valable l'adhésion bloc-obturateur/résine de scellement?

Cette étude tente de répondre à ces questions.

Matériel et méthode

Préparation des échantillons

Des incisives de bovin sont aplanies à leur surface labiale par usure avec un disque diamanté. Ces dents sont montées dans des blocs d'acrylique autopolymérisable pour permettre l'exposition de leur surface plane. Le poli final de cette surface d'émail est obtenu par sablage (grain 400) sur une table de polissage*. Les échantillons sont conservés dans une étuve à 37°C.

Les échantillons sont mordancés avec un gel d'acide phosphorique à 37 pour cent (60 secondes), sont rincés à l'eau (20 secondes) et séchés à l'air comprimé (20 secondes).

Des matrices en polysiloxane** de dimensions standardisées (anneaux cylindriques d'une mesure intérieure de 3 mm de diamètre sur 6 mm de haut) (Fig. 1) sont montées à l'aide de cire collante sur la surface de l'émail servant ainsi de moule à l'insertion du matériau direct. Les matériaux indirects sont fabriqués à partir des mêmes matrices en polysiloxane. Les échantillons sont assignés aux différents traitements à l'aide d'une table de nombres randomisés. Dix échantillons ont été préparés pour chacun des groupes mais certains ont été perdus par fracture de leur support en résine acrylique au moment du test de cisaillement.

Quatre variables indépendantes sont soumises à l'étude:

- 1) Porcelaine mordancée et silanisée (Mirage et ScotchPrime) (n=9)
- 2) Résine composite indirecte (P-50) (n=8)
- 3) Résine composite indirecte (P-50) et traitement au Scotchprep (n=8)

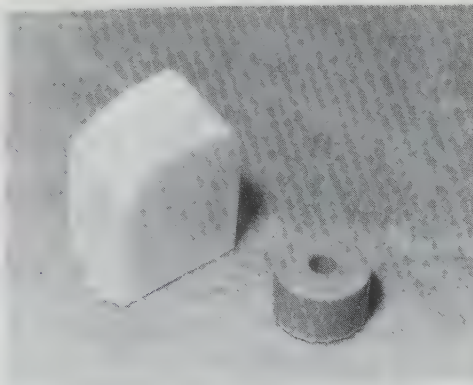


Figure 1 Matrice de polysiloxane et échantillon

- 4) Résine composite directe (P-50) (n=10)

Groupe 1

Les cylindres de porcelaine Mirage*** sont mordancés avec le Super Etch*** durant une période de 90 secondes. Ils sont rincés à l'eau courante et séchés à l'aide d'un jet d'air comprimé. La surface adhésive des cylindres est alors enduite d'une couche de silane (ScotchPrime§). Une résine de scellement auto et photopolymérisable expérimentale§ est malaxée et appliquée sur la surface d'émail et les excès périphériques de résine sont enlevés à l'aide d'une spatule d'insertion. Les échantillons sont soumis à deux expositions de 20 secondes à la lumière visible à angle de 45° sur deux côtés opposés du cylindre en direction de la jonction matériau-dent.

Groupe 2

Les restaurations indirectes de résine composite sont réalisées avec le P-50§. Une plaque de verre est enduite d'un séparateur/espaceur expérimental§. Les moules de polysiloxane sont posés sur cette surface pour que le bout servant à l'adhésion, l'intrados des cylindres de résine composite, y fasse contact. Le P-50 est inséré et polymérisé en trois additions successives de 2 mm suivies d'expositions de 20 secondes à la lumière visible. Le cylindre est extrait du moule et soumis à une autre exposition de 20 secondes à la lumière. Les échantillons sont ensuite soumis à une exposition de cinq minutes à 100-120°C. dans un four. Les échantillons ainsi obtenus sont collés à l'émail avec une résine de scellement dont les excès périphériques sont enlevés à l'aide d'une spatule d'insertion. Les échantillons sont soumis à deux expositions de 20 secondes à la lumière visible à angle

* Table de polissage, Buehler Ltd, 41 Waukegan Road, Lake Bluff, Illinois 60044.

** Hydrosil, Matériau d'empreinte à base de polysiloxane. Caulk, Milford, Delaware, 19963. Diamètre du moule: 3 mm; pour une telle surface, une résistance au déchirement de 1 Kg = 202 Psi.

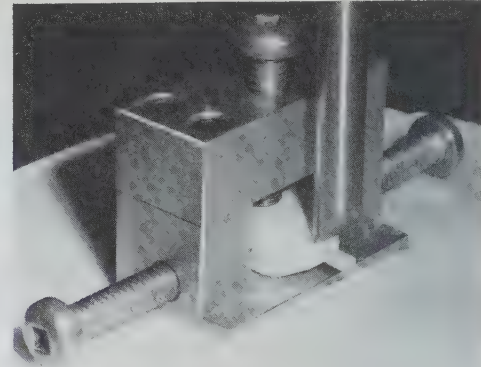


Figure 2 Échantillon sur l'appareil Instron

de 45° sur deux côtés opposés de l'échantillon en direction de la jonction matériau-dent.

Groupe 3

Le groupe 3 utilise la même technique de préparation que celle du groupe 2. Par contre, la surface de l'émail et l'intrados des cylindres sont en plus soumis à une exposition d'une minute au Scotchprep§ et séchés au jet d'air.

Groupe 4

Les restaurations directes sont aussi réalisées avec le P-50. Les surfaces d'émail mordancé sont enduites de résine Scotchbond 2§ et exposées à la lumière durant 20 secondes. Les moules de polysiloxane sont placés sur ces surfaces et y sont maintenus par de la cire collante. Les moules sont remplis de résine P-50 en trois additions successives de 2 mm suivies d'expositions de 20 secondes à la lumière visible. Les moules sont coupés à l'aide d'un bistouri et enlevés. Les échantillons sont finalement soumis à deux expositions de 20 secondes à la lumière visible à angle de 45° sur deux côtés opposés du cylindre en direction de la jonction matériau-dent.

Tous les échantillons sont conservés à l'étuve 20 heures avant l'épreuve de résistance mécanique pour permettre l'absorption d'eau.

Épreuve de résistance au cisaillement

Tous les échantillons sont soumis à l'épreuve de cisaillement sur un appareil Instron§§ à une vitesse de 2 mm par minute. (Fig. 2). La résistance au cisaillement est enregistrée par une imprimante sur papier à entraînement à une vitesse de 5 pouces par minute.

*** Chameleon/Mirage Dental Products Inc., P.O. Box 1458, Kansas City, Kansas 66117.
§ 3M Dental Products Division, 3M Canada Inc., Post Office Box 5757, London, Ontario, Canada N6A 4T1.

Discussion

Boyer et al.²⁴ dans une étude portant sur l'addition de résine composite à la résine composite déjà polymérisée suggèrent une adhésion équivalente à la résistance cohésive de la résine composite lorsque l'addition est faite dans un temps relativement court après la polymérisation (30 minutes). C'est le cas des groupes 3 et 4 puisque ces échantillons de résine composite ont été scellés une quinzaine de minutes après leur polymérisation secondaire à la chaleur. Les études de Boyer et al.^{24,25} rapportent qu'une surface de résine composite ayant été meulées présentent une capacité adhésive réduite en comparaison de surfaces non-meulées ou abrasées. Ils expliquent cette observation par le fait que le meulage expose des particules inorganiques ou des particules de résine (résines composites à particules micro-fines) polymérisées de longue date laissant ainsi une surface exposant moins de résine disponible pour l'adhésion.

La liaison relativement plus faible du groupe 4 pourrait s'expliquer de la façon suivante: même avec des additions successives de résine composite entre-coupées d'expositions à la lumière qui se veulent représentatives des situations cliniques, il n'en demeure pas moins que lors de l'application de la lumière, la polymérisation procède de la surface du matériau vers la zone adhésive. C'est donc plausible que ce faisant, des contraintes se développent dans le matériau compromettant ainsi la résistance adhésive tel qu'avancé par Asmussen²⁶. Lambrechts²⁷ rapporte d'ailleurs qu'une réduction des tensions internes d'une résine composite augmenterait ses propriétés mécaniques. Les groupes 1, 2 et 3 présentent des échantillons plus rigides que ceux du groupe 4. La porcelaine (groupe 1), de par sa nature est plus rigide que le composite. La résine composite secondairement polymérisée par la chaleur (groupes 2 et 3) est à son tour plus rigide que la résine composite à polymérisation directe^{28,29}. La technique indirecte évite justement la formation de contrainte dans le matériau puisqu'il peut alors accomplir sa contraction de prise sans contrainte sur l'adhésif. Selon Boyer et al.^{30,31} un matériau dont le module d'élasticité est élevé (rigide) favorise le maintien de la résistance adhésive par une meilleure distribution des tensions sur la surface alors qu'un matériau plus flexible concourt à la perte éventuelle de cette même résistance adhésive.

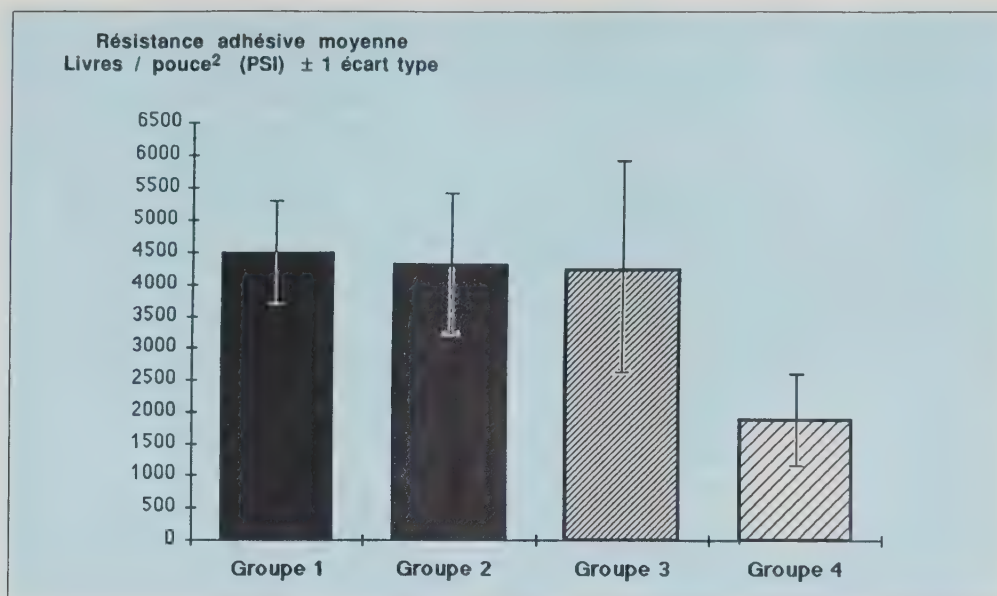


Figure 3 Résistance adhésive moyenne

TABLEAU I

Résistance adhésive moyenne

	psi	kg/cm ²	MPa
Groupe 1			
Porcelaine/Scotchprime	4505 (852)	316,80 (59,91)	31,06 (5,87)
Groupe 2			
Indirect/P-50	4330 (1351)	304,50 (95,00)	29,85 (9,31)
Groupe 3			
Indirect/P-50/Scotchprep	4246 (1880)	298,59 (132,20)	29,27 (12,96)
Groupe 4			
Direct/P-50	1910 (767)	134,31 (53,93)	13,16 (5,28)

(écart type entre parenthèses)

TABLEAU II

Résistance au cisaillement Analyse de la variance

Source	df	MS	F	probabilité
Traitements	3	14466810	9,22	0,0002
Résiduel	31	1568571		

TABLEAU III

Résistance au cisaillement Duncan's Multiple Range test (alpha = 0.05)

Source	Résistance moyenne psi	N	Groupement
Porcelaine/Scotchprime	4505	9	A
Indirect/P-50	4330	8	A
Indirect/P-50/Scotchprep	4246	8	A
P-50	1910	10	B

Les moyennes avec des lettres identiques ne sont pas statistiquement différentes.

§§ Appareil Instron, Model 4201, Instron Corporation, Canton, Massachusetts 02021.

En effet les auteurs rapportent une corrélation de 0,9 entre la résistance adhésive et la rigidité d'un matériau adhésif.

Résultats

Les résistances adhésives moyennes et leur écart type sont rapportés au **Tableau 1** et à la **Figure 3**.

Analyse statistique

Les techniques d'analyse de la variance sont effectuées pour l'analyse des résultats de l'épreuve de cisaillement. Une analyse a posteriori des facteurs expérimentaux significatifs est faite par un Duncan Multiple range test. Un niveau significatif (alpha) de 0.05 est utilisé pour accepter ou rejeter l'hypothèse nulle sur toutes les analyses statistiques.

Les résultats obtenus de l'analyse de la variance (**Tableau II**) indiquent une différence significative parmi les traitements.

Les résultats du Duncan Multiple Range test (**Tableau III**) indiquent que les trois premiers groupes ne sont pas statistiquement différents les uns des autres et que le quatrième groupe est statistiquement inférieur aux trois premiers. Ce qui signifie que le P-50 utilisé en technique directe possède une résistance adhésive à l'émail mordancé significativement moindre que celle des restaurations indirectes. Une estimation des différences entre le premier groupe et les autres est rapporté au **Tableau IV**. Elle tient compte de la variance et du nombre différent d'échantillons dans chacun des groupes. Seul le groupe 4 est différent du groupe 1 et son erreur standard (542) est près de cinq fois moindre que l'estimé de sa différence (2595).

Si la charge nécessaire au bris de la liaison composite direct/émail (Groupe 4) est significativement moindre que celle exigée dans les trois autres groupes, les liaisons porcelaine mordancée silanisée/émail, composite indirect/émail et composite indirect traité au ScotchPrep/émail ne sont pas statistiquement différentes l'une de l'autre.

Par ailleurs, nous pouvons aussi avancer l'hypothèse d'une exposition insuffisante à la lumière comme explication des résultats du groupe 4. Nous avons utilisé cinq expositions de 20 secondes pour polymériser la résine composite en technique directe. Ce qui nous semble être représentatif du temps d'exposition utilisé en pratique courante pour un volume semblable de résine composite. Cependant, le fabricant de cette résine composite recommande une exposition de 40 secondes par épaisseur de 2,5 mm pour la teinte "grise" que nous avons utilisée, suivie d'expositions supplémen-

TABLEAU IV

Estimation des différences

Variable	Estimation	E.S.
Groupe 1	4505	393
Groupe 2	- 175	573
Groupe 3	- 259	573
Groupe 4	-2595	542
Écart type résiduel	1179	
E.S.: erreur standard		

taires de 40 secondes par surface. Ce qui est supérieur aux temps utilisés dans cette étude. Il nous semble donc essentiel en technique directe d'assurer une bonne polymérisation par des temps d'exposition plus longs car on ne peut tabler sur la polymérisation secondaire par la chaleur pour assurer une polymérisation complète. Les indications du fabricant constitueraient un temps minimum que l'on devrait respecter.

Conclusion

Cette étude répond à certaines questions:

- Les restaurations indirectes de résine composite ont une résistance adhésive comparable aux restaurations de porcelaine silanisée, du moins telles que réalisées dans le contexte de cette étude, c'est à dire, avec une résine composite à module d'élasticité élevé, sans abrasion de l'intrados, et avec un scellement dans les vingt minutes suivant la polymérisation.
- Le séparateur utilisé ne compromet pas l'adhésion de la résine de scellement à l'intrados de la restauration.
- Le traitement au Scotchprep de l'intrados n'améliore pas la résistance adhésive des restaurations indirectes de résine composite mais il ne diminue pas non plus leur adhésion de façon significative. Cliniquement, il pourrait être sage de l'utiliser au cas où il y aurait contamination de l'intrados par de la salive mais cet élément devrait bénéficier d'une étude plus approfondie. Δ

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Les demandes de tirés-à-part peuvent être adressées au Dr. André Prévost, Faculté de Médecine Dentaire, Université de Montréal, C.P. 6128, Succursale A, Montréal, Québec, H3C 3J7.

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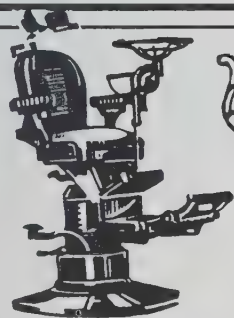
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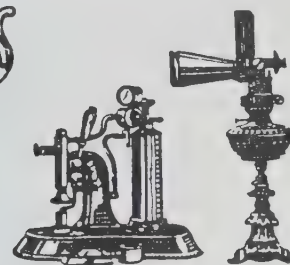
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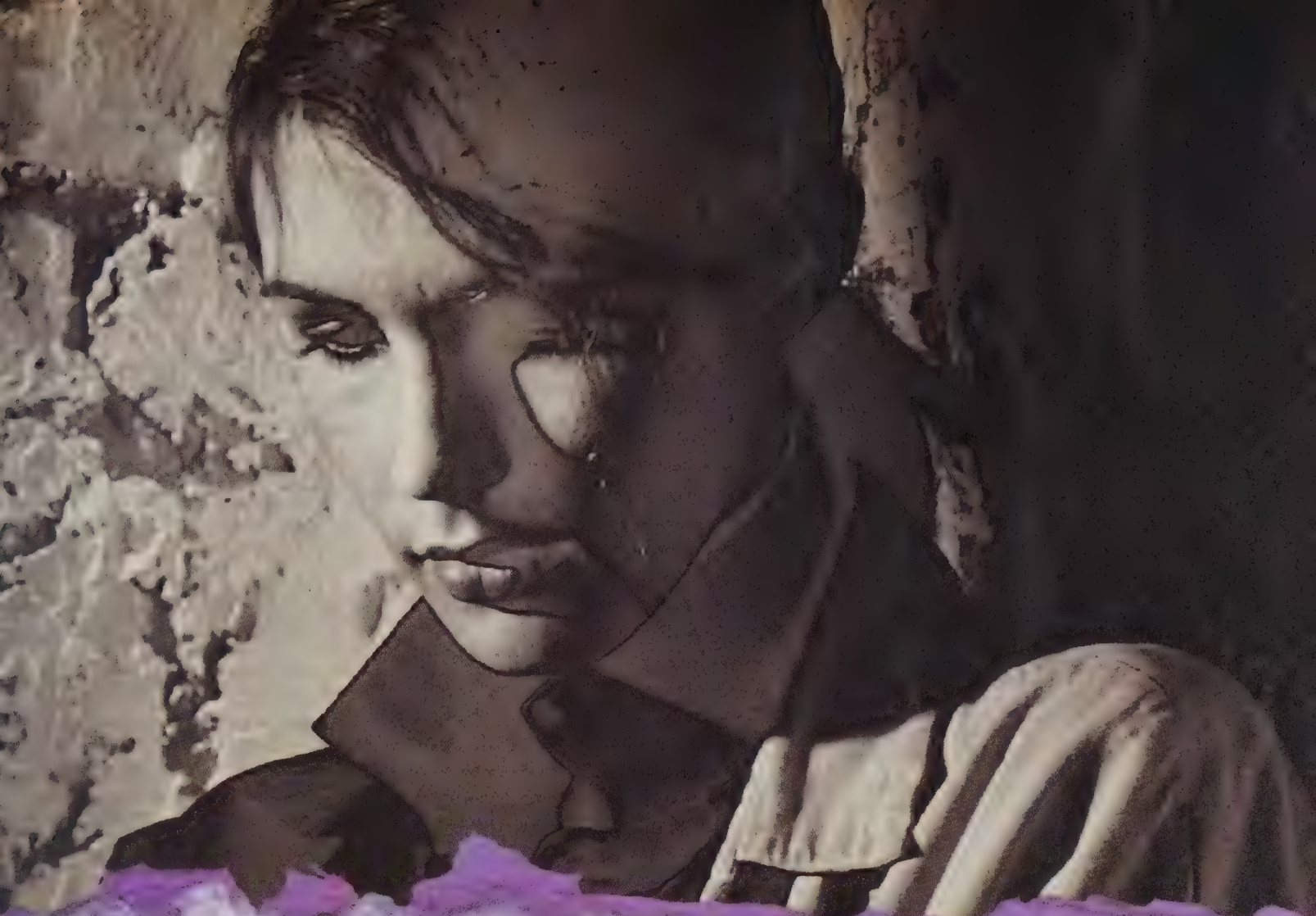
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Announcements

August/Août 1990

August: Annual Congress of International Association of Dental Students in Puerto Rico. Contact: The Secretary, International Association of Dental Students, c/o Fédération dentaire internationale, 64 Wimpole St., London, W1M 8AL, England.

August 24-28: Canadian Dental Association, Annual Convention: Quebec City, Quebec, Canada. (English and French). Please Contact: Dr. Michel Jahjah, General Chairman, CDA Conventions, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6 (613) 523-1770 FAX: (613) 523-7736.

August 24-28: 15th Biennial Conference of the New Zealand Dental Association, Dunedin, New Zealand: For further details, write Conference Secretary, PO Box 647, Dunedin, New Zealand.

August 25: International College of Dentists, Canadian Section — Annual Meeting Convocation: The Chateau Laurier Hotel, Ottawa, Ontario. Editor, N. Murnoe, 203-333 Bayview Ave., Willowdale, Ont. M2K 1G4.

August 25: A meeting of the Canadian Association of Dental Consultants will be held on Saturday August 25, 1990 at the Westin Hotel, Ottawa. All members as well as perspective members are urged to attend. For further information contact, Dr. J. Berman, (613) 234-1595, Ottawa.

August 25-28: Congress of the Association of Dental Education in Europe in Budapest, Hungary. For details, contact: Prof. Jolan Banoczy, Mikszath K ter 5, H-1088 Budapest, Hungary.

August 25-29: Canadian Dental Association, Annual Convention: Ottawa, Ontario, Canada (English and French). Contact: Dr. Michel Jahjah, General Chairman, CDA Conventions, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6. (613) 523-1770 FAX: (613) 523-7736.

August 27: 7:30 to 9:30 a.m., Pierre Fauchard Breakfast, Burgundy Room, Pierre Fauchard Academy, Monday, August 27th. Contact, Dr. Michael Crompton, 567 St. George Street, Moncton, NB. E1E 2B9, or call: (506) 857-2186, (506) 855-4856.

September/Septembre 1990

September: Annual Conference of the European Prosthodontic Association/Dutch Society of Prosthetic Dentistry in the Netherlands. Contact: Prof H. de Koomen, ACTA, Postbus 7161, 1007 MC Amsterdam, The Netherlands.

September 2-6: 10th Congress of the International Association of Dentistry for the Handicapped in Nice. Contact: Prof J.R. Jasmin, Université de Nice, UFR Odontologie, Faculté de Chirurgie dentaire, av Joseph Vallot, Parc Valrose, 06034 Nice, France.

September 5-7: 7th Biennial Congress of the International Academy of Gnathology (Asian Section) in Singapore. Contact: The Secretariat, IAG-7th Annual Congress, Communication International Assoc Pte Ltd, 450 Alexandra Rd, #10-00 Inchapec House, Singapore 0511

September 5-7: Singapore: International Academy of Gnathology, 7th Biennial Congress. Congress Man-

agement, Orchard Dental Centre PTE Ltd., 268, Orchard Road, Yen San Building, #05-07 Singapore 0923, 734-3162.

September 6-7: Federation of Prosthodontic Organizations Contact: Mr. Peter C. Goulding, 211 E Chicago Ave, Suite 948, Chicago, IL 60611, USA.

September 8-14: 78th Annual World Dental Congress in Singapore. Contact: Fédération dentaire internationale, 64 Wimpole St, London W1M 8AL, England.

September 10-14: 10th Congress of the European Association for Cranio-Maxillo-facial Surgery in Brussels. Contact: Mrs. H. van Leemputten, rue Joseph Stallaert 28, B-1180 Brussels, Belgium.

September 12-15: dentchnica 90 and the 10th International Congress of Dental Technicians in Cologne, Germany. For information, write: Verband Deutscher Zahntechniker-Innugen, Ilkenhansstraße 6, D-6000 Frankfurt 50, West Germany.

September 12-15: Dentechnica '90 in Cologne — The 10th International Congress of Dental Technicians with Trade Exhibition for Dental Laboratories, in the grounds of the KolnMesse, Messeplatz 1, Postfach 21-07-60, d-5000 Koln 21 (Deutsch).

September 13-16: The Canadian Academy of Endodontics in conjunction with The College of Dental Surgeons of Saskatchewan present SEPTEMBER-FEST in Saskatoon — Ramada Renaissance Hotel, Saskatoon, Saskatchewan. For more information contact: Dr. Paul Teplitsky, Dental Clinic, University of Saskatchewan, Saskatoon, SK. S7N 0W0. Tel: (306) 966-5089.

September 13-16: American Academy of Orthodontics for the General Practitioner in Stevens Point, WI. Contact: Ms. Janes Taylor, 3953 N 76th, Milwaukee, WI 53222, USA.

September 16-20: New Zealand Association of Orthodontists, Queenstown, New Zealand: Dr. P.G. Gilbert, P.O. Box 5217, Dunedin, New Zealand.

September 17-20: The 4th Meeting of International Academy of Periodontology, to be held in Istanbul. Contact: Mr. M. Midda, University of Bristol, Dental School and Hospital, Lower Maudlin Street, Bristol BS1 2LY, England.

September 27-29: 41st Annual New Orleans Dental Conference Contact: Ms. Norma Ward, New Orleans Dental Conference, Suite 119, 3101 W Napoleon Ave, Metairie, LA 70001, USA.

September 27-30: 108th Annual Session of the American Dental Trade Association in Hilton Head, South Carolina. Contact: Mr. Nikolaj Petrovic, American Dental Trade Association, 4222 King St, Alexandria, VA 22302, USA.

October/Octobre 1990

October 1: Winnipeg Dental Society sponsored course: "Aerobics Program For the Total Well-Being" by Dr. Ken Cooper. Registration Fee \$75. Contact: Dr. Philip Poon 942-2438.

October 1-5: Annual Conference of the Canadian Society of Forensic Science, Skyline Hotel, Ottawa, Ontario, Canada. The theme is FORENSICS 90, with workshops in DNA, Blood splatter Pattern Analysis, Fire Investigation, Polymers, Document Examination and Thermography. Contact: CSFC, Suite 215, 2660 Southvale Crescent, Ottawa, Ontario, Canada K1B 4W5.

October 7-8: American Board of Oral & Maxillofacial Radiology 1990 Certifying Examination in Boston, MA. Applications must be submitted by March 1, 1990. For further information or application forms, please contact: Dr. Axel Ruprecht, University of Iowa, College of Dentistry, DSB S-356, Iowa City, IA 52242-0101.

October 10-13: 53rd Annual Session of the American Association of Public Health Dentistry Deadline for abstracts April 1/90. Send abstracts to: Alice M. Horowitz, 6307 Herkos Crt, Bethesda, MD 20817 USA.

October 11-14: London, Ontario. Annual Meeting of the Canadian pain society (IASP Chapter). Contact: Ms. Inese Kramins, Local Arrangements committee, Department of Psychology, University of Western Ontario, London, Ontario, N6A 5C2, Canada.

October 13-16: 131st Annual Session of the American Dental Association in Boston. Contact: Office of International Affairs, American Dental Association, 211 E. Chicago Ave, Chicago, IL 60611, USA.

CDA's 1990 Teaching Conference, Toronto, October 19, 20: Theme: Nutrition education. Information from Nina E. Burgess, Preventive Department, Faculty of Dentistry, University of Toronto, 124 Edward Street, Toronto, Ont. M5G 1G6. Telephone 1-416-979-4311, or FAX 1-416-979-4566.

October 23-30: Annual Meeting of American Academy of Maxillofacial Prosthetics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. October 28 through November 30, 1990. Guest fees for technicians and assistants are \$50.00 and for all others \$150.00. For more information please contact Nikzad S. Javid, Chairman, International Relations Committee of the American Academy of Maxillofacial Prosthetics at the University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida, 32610-0435. Phone (904) 392-4231. Or write Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, GA, 30912-0200.

November/Novembre 1990

November 2: Maximizing Team Effectiveness, and Computers & Dentistry: Sponsored by the Winnipeg Dental Society. Instructors are Dr. Bud Sipko and Dr. Diane Rekon. Fee is \$80. Contact Dr. Philip Poon, 942-2438, Winnipeg Dental Society.

October 31–November 3: Annual Meeting of the American College of Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. Guest fees for technicians and assistants are \$50.00 and for all others \$150.00. For more information please contact me at University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida, 32610-0435, phone # (904) 392-4231 or Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, GA, 30912-0200.

November 13-18: American Dental Association: 131st Annual Session will be held in Boston, Massachusetts. For further information, write the Council on ADA Sessions and International Relations, American Dental Associations, 211 East Chicago Avenue, Chicago, Illinois 60611, USA.

November 22: Toronto Academy of Dentistry, 53rd Annual Winter Clinic, Metropolitan Toronto Convention Centre, 255 Front Street West, Toronto, Ontario. For information contact the Academy of Dentistry at (416) 967-5649.

November 23: Vancouver and District Dental Society Annual Meeting: In Vancouver BC, Grey Cup Week. Contact Mrs Susan Ryan, VDDS, Suite 401-1765 West Eight Ave., Vancouver. V6J 5C6.

Offices and Practices

BRITISH COLUMBIA—Duncan: One of the fastest-growing areas of BC. 15-year-old general practice. Large waiting room. Consult room. 3 Ops., 4th plumbed with G.E. Panelips. Six years on computer. N²O². Downtown location, 40 minutes from Victoria. Call (604) 748-3687 weekdays, evenings.

BRITISH COLUMBIA—Central Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472.

BRITISH COLUMBIA—Parksville: Parksville, BC needs a dentist. Set up practice in this fast-growing city on the East Coast of Vancouver Island. Professional building under construction. Join 8 family physicians, specialists, pharmacy, laboratory, etc. Call Dr. Graham White any evening after 7:30. (604) 248-9203.

BRITISH COLUMBIA—Vancouver: WANTED to purchase a retirement-type practice. Patient base to support, 3 days a week. Reply to CDA Box 2488.

BRITISH COLUMBIA—Vancouver: Enjoy the great West Coast lifestyle! Very busy, growing family practice for sale. High gross, 28-hour work week, shared office for great net. 3 modern, equipped operatories, with ceiling tv's, Exan computer system for 5 years. Not inexpensive, but worth it! Serious calls only please. (604) 494-4303.

BRITISH COLUMBIA—Vancouver Suburb: Practice for sale. Busy, family practice established more than 15 years. Attractive office, recently relocated to new building with good exposure, 3 ops of new equipment. Principal dentist and one associate. Well-organized office, very experienced staff who completely manage the practice. Phone: (604) 531-7688 (evenings).

BRITISH COLUMBIA—Vancouver Island: Well-established and growing family practice for sale in "booming", beautiful Campbell River, the "Salmon Fishing Capital", with consistently mild temperatures and excellent half-hour flight connections to Vancouver. This progressive, modern, equipped 800 sq. ft. — 2 Ops, eight-window practice, provides lots of C & B, good gross and low overhead. Will sell for half of last year's gross. Phone (604) 287-4016.

BRITISH COLUMBIA—Victoria and Gulf Islands: Something different. 2 days a week in a children's hospital in Victoria. One day on each of two beautiful Gulf Islands. Great life style, low overhead, interesting work at a reasonable pace. Good gross. Call evenings, (604) 652-4970.

BRITISH COLUMBIA—Victoria: PRACTICE FOR SALE. Reasonably priced. Please reply CDA Box #2490.

ALBERTA—Calgary: Busy 10-year-old family practice in desirable suburban location. Plaza location between medical clinic and pharmacy. 3 ops., Pan., N₂O. Owner selling for health reasons. Phone: (403) 256-3234.

ALBERTA—Calgary: FOR SALE. 1/4 share in three-year-old expanding dental practice. High traffic mall location. Shared reception area with busy medical clinic. Floor-to-ceiling windows in all operatories. Three operatories fully equipped, two more plumbed. **Owner leaving Calgary.** (403) 933-2000, Monday to Friday, 8:30 to 5:00.

ALBERTA—Edmonton: Practice for Sale. Excellent opportunity for established dentists or new graduates. Modern, 5-operator general practice located in downtown professional building. Phone (403) 422-2783 (days), (403) 467-6887 (after 6 pm).

ALBERTA—Fort McMurray: Reduce office costs while on holidays. LOCUM LOCATORS can supply replacement dentist. (403) 791-7799, 3-101 Signal Road, Fort McMurray, Alberta T9H 4N6.

SASKATCHEWAN: One of the largest family practices in the province, for sale or associateship leading to purchase, in medium-sized city; 6 operatories, with 4 x-rays and panelips. Very large patient base. Anxious for action. Call CDA (613) 523-1770 ext. 230 for information.

SASKATCHEWAN: Very busy, family-oriented practice for sale or associateship leading to purchase in small Saskatchewan city. Four fully-equipped operatories, including panelips. Large patient base makes it suitable for 2 new graduates or 1 experienced dentist. Very reasonable selling price. Reply to CDA Box 2420.

SASKATCHEWAN: Practice for sale. Large rural Saskatchewan practice for sale. Buyer to take over lease as purchase price. Excellent opportunity. Please write CDA # 2483.

ONTARIO—Kingston Suburb/Amherstview: For sale: Well-established general practice. Ground floor, 1200 square feet, four operatories fully-equipped. Rapidly growing and expanding community. Owner is willing to associate for two and a half days a week. Please call: (613) 389-0538.

NORTHWESTERN ONTARIO: Dentist position available in mobile school treatment program. Clinic sites located in Kenora-Rainy River district of Ontario. Competitive salary and benefits offered. For more information, contact: Dr. L.W. Armstrong, Director, Preventive Dental Services, Northwestern Health Unit, 21 Wolsley St., Kenora, Ont. P9N 3W7 Tel: (807) 468-3147.

ONTARIO—Toronto: ORTHODONTIST required for a largely adult downtown orthodontic practice. Very pleasant environment. Call Dr. Peter Gold, business (416) 928-9529, or home (416) 927-1796.

NEW BRUNSWICK—Moncton: Busy preventive general practice seeking a personable associate with a full range of clinical & patient communication skills. Talented, self-motivated individual will have excellent income and serious partnership opportunity. Please contact

Dr. Fenton Smith office: (506) 859-6839 or res.: (506) 383-9032.

NOVA SCOTIA—Halifax: Established solo family practice. High net, low pressure. Central location near Dalhousie University. Dentist pursuing specialty training. Please call: (902) 429-5939.

Associateships Available

BRITISH COLUMBIA: LOCUM/ ASSOCIATESHIP. Experienced locum required June/July for six months extended leave. Separate associate position also available. These positions can be combined providing a unique career opportunity in our busy state-of-the-art practice for a capable and conscientious practitioner. Reply to Dr. Greg Nelson (604) 246-8134.

BRITISH COLUMBIA—Abbotsford: ASSOCIATE REQUIRED. Associateship with view to partnership available to career-minded dentist. Well-established, busy general practice is located one hour east of downtown Vancouver. Call: Dr. A. Quadir (604) 852-8487.

BRITISH COLUMBIA—Chilliwack: Associateship with view to partnership available to dentist committed to continuing education and excellence in patient care. Busy practice located one hour east of Vancouver in beautiful Fraser Valley. Area offers skiing, hiking, boating and mild climate. Present associate returning to school after having busy practice for 3½ years. For further information, contact Dr. Michael Thomas, 102-45625 Hodgins Ave, Chilliwack BC V2P 1P2 or call (604) 792-0021 (office) or (604) 795-9818 (residence).

BRITISH COLUMBIA—Duncan: 45 minutes from Victoria. Full-time Associate required. Busy general practice in Medical dental building with excellent support staff including Hygienists. Call (604) 748-8141, Drs. Anna Wang and Gary Chilibeck.

BRITISH COLUMBIA—Nanaimo: Associate required. Excellent opportunity

in busy and growing practice in mall setting. Wonderful climate and recreational facilities. Close to Vancouver and Victoria. Reply: Dr. Patricia Crosson — days (604) 754-1949, evenings (604) 468-9892.

BRITISH COLUMBIA—Penticton: Full-time associate needed to assume patient load of departing associate July 1, 1990. Exceptional remuneration and opportunity for future ownership, with own associate, in a busy, progressive, and well-established practice. Call (604) 492-6844.

ALBERTA: Associate in vacationland Alberta. Excellent terms in very busy practice. Call (403) 849-2233 or (403) 849-4626.

ALBERTA—Calgary: PART-TIME ASSOCIATE required for busy general practice in downtown Calgary. Contact: Dr. Maureen Meneley, 1227-12th Avenue, South West Calgary T3B 5B7.

ONTARIO—Belleville: ASSOCIATE REQUIRED, full-time, for Belleville area offices. Progressive, preventive-oriented family practice. Bright, modern clinic facilities with excellent staff. Buy-in possibilities. Please call: (613) 466-2777, days or (613) 967-1016, evenings and weekends.

ONTARIO—Hamilton/Mississauga: Periodontist looking for part-time associateship in Hamilton to Mississauga area. Specialist or large progressive general practice preferred. Please reply to CDA Box #2491.

ONTARIO—Leamington: Associateship leading to ownership. We require a special person to join our rapidly expanding general dentistry practice in a recently completed, state-of-the-art facility. This individual must believe in clinical excellence, in the value of a team approach and in the importance of on-going continuing education. A full-time position is available immediately. If you are seeking a challenging and rewarding future in dentistry, please call (519) 322-2866 and ask for Lynn.

ONTARIO—Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent oppor-

tunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq ft. Modern facilities in professional walk-in medical-dental. Positions available June 1990. Call: (416) 452-7111.

ONTARIO—Sarnia: Associate required for a full- or part-time position. This general practice offers full patient load, modern equipment and high insurance coverage in a professional setting. Excellent income. Buy in or partnership opportunity. Dr. T. Pringle, (519) 542-3427.

ONTARIO—Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60 per cent associate percentage offered. Call (705) 522-4252.

ONTARIO—Toronto: ASSOCIATESHIP AVAILABLE for two to three days a week in downtown group practice. Contact Lisa (416) 535-2111.

NEW BRUNSWICK—Saint John: Associates required for a busy, well-established general practice with emphasis on preventive, advanced restorative and cosmetic dentistry. Our new, computerized state-of-the-art clinic boasts an excellent support staff and is located in a high-traffic mall connected to several office towers. We are looking for an enthusiastic, outgoing, conscientious person with good interpersonal skills. The successful candidate must share our beliefs in clinical excellence in patient care, the value of the team approach and of ongoing continuing education. Saint John, which is by the sea, offers outstanding recreation opportunities — fishing, hunting, skiing, sailing, golf, affordable housing, good schools and easy access to major Canadian and US centres. This is an excellent opportunity for those seeking a challenging and rewarding future in dentistry. Please write to: CDA Box 2492.

NEWFOUNDLAND: LOCUM REQUIRED for rural dental practice, Burin Peninsula, from August to December 1990. Please reply Dr. M.T. Flynn (709) 891-2390.

Auxiliaries

BRITISH COLUMBIA—Abbotsford: HYGIENIST WANTED Full-time hygienist required for busy practice in Abbotsford, British Columbia (one hour east of downtown Vancouver). Applicants must be career minded. Being a "team-player" with above average verbal skills essential for this position. Contact: Mr. M. Motani (604) 852-8487 (collect).

Opportunities Available

BRITISH COLUMBIA—Nakusp: Ideal starter or retirement practice in beautiful Nakusp. Great life-style and low overhead. Call evenings (604) 265-4647.

BRITISH COLUMBIA—Kootenay: CERTIFIED DENTAL HYGIENIST wanted in southern British Columbia, Kootenay. Full-time or part-time. Reply to CDA Box #2482.

BRITISH COLUMBIA—Prince George: Enjoy the great outdoors of the northern interior! Female dentist with 5 years experience in growing, general, family-oriented practice has an opening in a modern, computerized office for someone seeking a long-term arrangement with possibility of future buy-in. Reply to CDA Box 2479.

BRITISH COLUMBIA—Vancouver: Sale of total or half interest in a very busy high gross practice. Broadway and Commercial area. Please write CDA # 2489.

BRITISH COLUMBIA—Vancouver: ORAL AND MAXILLOFACIAL SURGERY PRACTICE FOR SALE. Full scope, well-established contemporary practice in excellent location has afforded me this luxury. Modern, spacious, well-equipped office. Prefer outright purchase and will consider association leading to purchase. Replies to CDA Box 2487.

ALBERTA: Practice for sale. Alberta dental practice for sale. Very busy practice. Dentist retiring for medical reasons. Call (403) 849-2233 or (403) 849-4626.

ALBERTA—Calgary: Excellent opportunity for a dentist to purchase a large, thriving practice in an exceptional recreational area. If you enjoy a partnership environment, excellent income potential, and good retirement benefits, please call (403) 289-3746.

ONTARIO—Belleville: ASSOCIATE REQUIRED, full-time, for Belleville area offices. Progressive, preventive-oriented family practice. Bright, modern clinic facilities with excellent staff. Buy-in possibilities. Please call: (613) 466-2777, days or (613) 967-1016, evenings and weekends.

ONTARIO—Toronto: PERIODONTIST REQUIRED. For one day in downtown group practice as an associate or to share space. Contact Lisa (416) 535-2111.

ONTARIO—New Liskeard: SALARIED DENTIST. The Timiskaming Health Unit requires to work in Children's Mobile Treatment Program. Salary: \$75,000-\$78,000 annually. Location: based in New Liskeard with travel within the Timiskaming District. Good Fringe Benefits! Please apply to: Dr. W.M. Coulby, D.D.S., D.D.P.H., Director of Dental Services, Postal Bag 2012, Timmins, Ontario, P4N 8B7, phone (705) 267-1181.

ONTARIO—Niagara: ENDODONTIST, PROSTHODONTIST. Large, modern specialist's office in St. Catharines has space available for a dedicated Endodontist, Prosthodontist or other compatible dental specialist. Excellent regional access to all parts of this 500,000 population underserved area. Opportunity for full- or part-time associate. Lease or buy-in potential. Please call (416) 687-3636.

ONTARIO—North Toronto: Position available immediately for a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426.

NEWFOUNDLAND—Gros Morne National Park: For sale, lease or for associateship. Thriving practice in beautiful park setting. Two fully equipped operatories. Owner staying in area and willing to work part-time or cover for vacations. Phone (709) 458-2111 (O) or (709) 458-2147, Dr. Marina Sexton.

Equipment

ALBERTA—Lethbridge: For sale: Nitrous Head. FRAZER QUANTIFLEX MDM, N²O² Unit. All new parts. Call (403) 329-1616.

SASKATCHEWAN: IMPLANTS: for Electric motor/physiodispenser. Electric motor handpiece 280:1. Electric motor h. 15:1 redn. contra-angle. Electric motor h. 10:1 redn. contra-angle. All for \$600.00. Call (306) 525-9620.

Vacation Rentals

BRITISH COLUMBIA—Whistler/Blackcomb: Walk to village and lift from my super 3 bedroom + loft chalet! Stunning view, fully-equipped. Sleeps eight comfortably. \$2000 per week. Call Dr. David Speirs (604) 874-3404.

BRITISH COLUMBIA—Whistler: If you are planning a summer holiday don't miss this opportunity. \$700.00/week in scenic Whistler for a fully equipped new house. Sleeps to 6 to 8. Lots of summer fun hiking, biking, golf, tennis, fishing, swimming, etc. Also call now for next winter's ski season. For reservation call (514) 562-8255.

BRITISH COLUMBIA—Whistler: Three-to-four-bedroom townhouse in Nordic Estates. Three baths, Jacuzzi tub fully-furnished with deck and barbecue. Available for nightly, weekly or monthly rental. Please call, Dr. Ed Murdock, (604) 736-5850 or Dr. Ken Phillips, (604) 433-5756.

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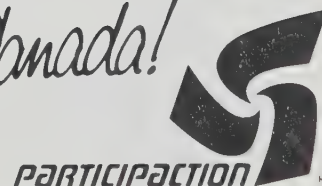
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SOFTBALL
PLAYERS



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Way to go, Canada!





Learning to live with MS.

Living with multiple sclerosis means making a lot of changes. To Sheila MacDonald of Sydney, Nova Scotia, it meant giving up a demanding career as a pediatric nurse for a much less active life as a Project Review Clerk at the Canada Employment Centre.

Thankfully the Multiple Sclerosis Society was there to help and today, Sheila in turn lends her support to others at the chapter. "I make a point of talking to new people at the meetings," she says. "They can call on me."

It's part of an important support network. People who need people. People who need your help too.

PLEASE...SUPPORT THE MULTIPLE SCLEROSIS SOCIETY OF CANADA.

You'll never know how good it feels to be a volunteer until you try it.

Multiple Sclerosis

Please check appropriate box & mail to:
Multiple Sclerosis Society of Canada
250 Bloor St. East, Suite 820,
Toronto, Ontario M4W 3P9

- ☐ I would like more information about MS
☐ I would like more information about becoming a volunteer.

Name _____

Address _____

Postal Code _____



^(acyclovir) **ZOVIRAX** OINTMENT 5% (4 g and 15 g tubes)

INDICATIONS AND CLINICAL USE: ZOVIRAX Ointment 5% is indicated for the management of initial episodes of genital herpes simplex infections. It is also indicated in the management of nonlife-threatening cutaneous herpes simplex virus infections in immunocompromised patients. The prophylactic use of this preparation has not been established.

In genital herpes, appropriate examinations should be performed to rule out other sexually transmitted diseases.

These indications are based on the results of a number of double-blind, placebo-controlled studies which examined changes in virus excretion, healing of lesions and relief of pain. Because of the wide biological variations inherent in herpes simplex infections, the following summary is presented merely to illustrate the spectrum of responses observed to date. As in the treatment of any infectious disease, the best response may be expected when therapy is begun at the earliest possible moment.

In immunocompromised patients, 93% were virus negative after 5 days of topical ZOVIRAX therapy, whereas only 35% of placebo recipients were virus negative at the same time.

In patients with herpes labialis, there was a significantly greater decrease in the amount of virus excreted after one day of therapy in those receiving ZOVIRAX within 8 hours of the onset of cold sores when compared to identically treated placebo patients.

Because complete re-epithelialization of herpes-disrupted integument necessitates recruitment of several complex repair mechanisms, the physician should be aware that the disappearance of visible lesions is somewhat variable and will occur later than the cessation of virus shedding. All immunocompromised patients who received topical ZOVIRAX had healed their lesions 23 days after the initiation of a 10-day course of therapy. 75% of placebo patients had healed lesions at that point. Some placebo patients continued to have visible lesions for more than 30 days.

Pain associated with herpes infections is highly variable in frequency and intensity. One hundred percent of the ZOVIRAX-treated immunocompromised patients were pain-free by day 23 versus 70% of placebo-treated patients.

Whereas cutaneous lesions associated with herpes simplex infections are often pathognomonic, Tzanck smears prepared from lesion exudate or scrapings may assist in the diagnosis. Positive cultures for herpes simplex virus offer the only absolute means for confirmation of the diagnosis.

CONTRAINDICATIONS: ZOVIRAX Ointment 5% is contraindicated for patients who develop hypersensitivity or chemical intolerance to any of the components of the formulation, such as polyethylene-glycol.

WARNINGS: ZOVIRAX Ointment 5% is intended for topical use only and should not be used in the eye or on mucous membranes.

PRECAUTIONS: The recommended dosage, frequency of application and duration of treatment of ZOVIRAX Ointment 5% should not be exceeded.

It is not known whether acyclovir is excreted in human milk.

Because many drugs are excreted in human milk, caution should be exercised when ZOVIRAX is administered to a nursing mother.

ZOVIRAX Ointment 5% should be used during pregnancy only if the physician feels the benefit will outweigh the possible harm to the fetus.

Safety of use of ZOVIRAX Ointment 5% in children has not been established.

There exist no data, at this time, which demonstrate that the use of ZOVIRAX Ointment 5% will prevent transmission of infection to other persons.

Since most cutaneous herpes simplex virus infections result from reactivation of latent virus, it is unlikely that ZOVIRAX Ointment 5% will prevent recurrence of infections when applied in the absence of signs and symptoms. ZOVIRAX Ointment 5% should not be applied in an attempt to prevent recurrences: application should commence only at the earliest prodromal sign of disease onset.

Although clinically significant viral resistance associated with the use of ZOVIRAX Ointment 5% has not been observed, this possibility exists.

ADVERSE REACTIONS: Because ulcerated genital lesions are characteristically tender and sensitive to any contact or manipulation, patients may experience discomfort upon application of ointment. In the controlled clinical trials, mild pain (including transient burning and stinging) was reported by 103 (28.3%) of 364 patients treated with ZOVIRAX Ointment 5% and by 115 (31.1%) of 370 patients treated with placebo; treatment was discontinued in 2 of these patients. Other local reactions among acyclovir-treated patients included pruritus in 15 (4.1%), rash in 1 (0.3%) and vulvitis in 1 (0.3%). Among the placebo-treated patients, pruritus was reported by 17 (4.6%) and rash by 1 (0.3%).

In all studies, there was no significant difference between the drug and placebo group in the rate or type of reported adverse reactions.

SYMPTOMS AND TREATMENT OF OVERDOSAGE: Overdosage by topical application of ZOVIRAX Ointment 5% is unlikely because of limited transcutaneous absorption.

DOSAGE AND ADMINISTRATION: Apply ZOVIRAX Ointment 5% liberally to the affected area 4 to 6 times daily for up to 10 days. A sufficient quantity of ointment should be applied to adequately cover all lesions. A finger cot or rubber glove should be used while applying ZOVIRAX in order to prevent:

- (1) autoinoculation of other body sites or
- (2) transmission of infection to other persons

Therapy should be initiated as early as possible following onset of signs and symptoms.

AVAILABILITY: ZOVIRAX Ointment 5% is available in tubes of 4 g and 15 g. Each gram contains 50 mg acyclovir in a polyethylene-glycol base. ZOVIRAX Ointment 5% is for topical administration.

Product Monograph available on request.

Reference:

1. Whitley RJ, Levin M, Barton N, et al: Infections caused by herpes simplex virus in the immunocompromised host: Natural history and topical acyclovir therapy. *J Infect Dis* 1984;150:323-329.

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The Character of a Dental Meeting

Known to few, participated in by many, behind the scenes where *all* the work is done for the education and pleasure of attendees are the dedicated men and women who are members of a group called the "Conference on Dental Meeting Planning."

Twice each year, 50+ men and women meet, usually in conjunction with a major meeting/convention. They discuss a wide range of topics and share experiences, good and bad, to try and constantly upgrade what attendees see and feel at conventions. These topics include length of lectures, promotion, timing and publicity, site selection, longterm planning, financial forecasting, logistics of AV needs re space decision, proper placement of lecturers and topics to maintain interest for the duration of a meeting, registration arrangements, exhibitor placement and members' social events, opening ceremonies, hosting duties, committee formations and selections, printing, postage, proofreading, and on and on. . . . I could fill 10 pages of complete detail what is required to have members of a dental team attend conventions and feel a sense of order.

This is certainly no accident and not everything goes according to plan as Murphy's Law states so eloquently, but because members of this special group meet regularly and share the good, the bad and the ugly — problem situations are handled smoothly and 95 per cent of us who attend the meetings are never aware they existed.

You may wonder — why would the super successful groups like the Hinman Dental Meeting, the Chicago Midwinter, the Greater New York, the California Dental Association, and in Canada, the Canadian Dental Association and Les Journées Dentaires, need to improve — they already have attendance ranging from 12,000 all the way up to 30,000. Amazing!

The answer is they care — they are as dedicated to providing excellence in meetings as we are in providing excellence in the dental care of our patients.

Most meetings start their planning three years in advance, and most of the group members are not paid and those who are, it is not enough.

After having been involved in meeting planning for close to 10 years and a frequent attendee who is fortunate enough now to be a lecturer, I felt it was time someone gave the kudos that are deserved to this dedicated group of people who belong to the conference on "Dental Meeting Planners." They do and work and plan and worry for our benefit. Don't forget to say thank you at the next meeting you attend.

*Ken A. Newman, DMD
Vancouver, B.C.*



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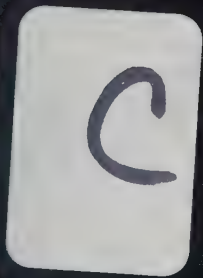
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Symposium Report
Sanguinaria Research: New Perspectives
Toronto, Ontario

Sponsored by Vipont Pharmaceutical, Inc.

Cover Page

Pictured is the *Sanguinaria canadensis* L. or bloodroot plant. It is a perennial, native to North America, which can be found in cool, moist, deciduous woods from Quebec to Florida and as far west as the Mississippi River.

Photo Credit: Leonard Lee Rue III

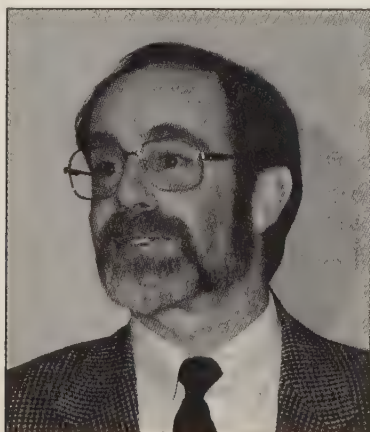
JOURNAL

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Symposium Report

Richard Ellen, DDS, Moderator
Wednesday, April 25, 1990
Toronto, Canada

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Richard Ellen, DDS

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The Sanguinaria Story — An Update And New Perspectives

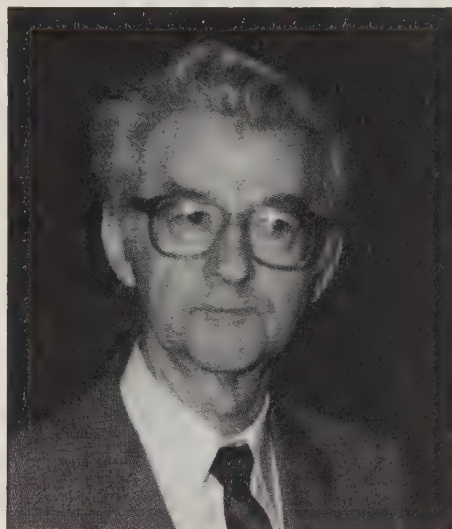
(Overview of the Toronto Symposium)

Gordon Nikiforuk, DDS, MSc, FRCD (C)
Department of Preventive Dentistry
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There is wide acceptance, within the dental research community, that the bacterial dental plaque is an essential etiological factor in the two ubiquitous diseases of the oral cavity, viz., dental caries and periodontal disease. Based on this fact several therapeutic philosophies emerged — treat the diseases as an infection and/or increase the resistance of the host target tissues. A dramatic reduction in the prevalence of dental caries has been achieved by the use of fluoride regimens whose mechanism of action is to increase the resistance of dental enamel to demineralization processes. No such parallel exists for treating periodontal disease; the most successful management of periodontal disease is to treat it as an infection. Not surprising, therefore, is the increased tempo to develop therapeutic agents that would reduce plaque, gingivitis and hopefully, in the long run, periodontitis. One such agent which has been the subject of many clinical investigations is sanguinaria extract — the subject of the symposium under review.

The symposium held in Toronto, Canada had as its major objective the synthesis of recent, long-term studies on the clinical effectiveness of sanguinaria in oral formulations (toothpaste and oral rinses) and presentations on its chemical properties, safety profile, and mechanism of action.

The first paper of the symposium, by Dr. R.J. Harkrader et al. dealt with the history of sanguinaria extract, its sources, purification, biochemistry and pharmacokinetics. Sanguinaria extract (SaE) is a herbal preparation obtained from *Sanguinaria canadensis* (bloodroot) and has been used in preparations in homeopathic and folklore medicines. More recently extracts or tinctures of the bloodroot



Gordon Nikiforuk, DDS, MSc, FRCD(C)

plant have been used widely as expectorants in cough syrups and cold medicines. The extract is a mixture of several benzophenanthridine alkaloids the principal one being sanguinarine (Sa). Sanguinarine and other alkaloids in SaE undergo a dynamic, pH dependent, equilibrium between the highly lipophilic alkanolamine base form and the hydrophilic iminium form. The SaE-containing oral rinse, at pH 4.5, exists in the positively charged iminium form which is responsible for the high substantivity of the preparation. The preferential high affinity of SaE for plaque has led to its use as an anti-plaque agent, in a formulation containing $ZnCl_2$, in a dentifrice and oral rinse.

Professor C. Walker, from the University of Florida, reviewed studies dealing with the microbial effects and the mechanism of action of SaE. *In vitro* studies demonstrated that the MIC for a wide spectrum of oral organisms is less than or equal to 16 $\mu g/ml$, a concentration that is readily detected in plaque several hours after an oral rinse containing 0.03% SaE. *In vivo* studies involving the combined use of SaE-containing

dentifrice and oral rinse over a six month period indicated a decrease in the anaerobic flora, a decrease in bacterial mass associated supragingival plaque with no significant emergence of opportunistic or periodontal pathogens.

Since 1983, some twenty three clinical studies, of varying duration, and design have been published. These studies may be categorized as short-term trials (30 days or less); intermediate term trials (30 to 90 days); and long-term studies (6-months) of which there were eight. Given the great variation in the experimental design which characterized these studies it is not surprising that the findings, too, varied. In seventeen clinical trials positive results were reported while in thirteen trials the results from the use of various formulations were indefinite or negative. Several principles relating to the design of studies intended to evaluate anti-plaque agents, such as sanguinaria formulations, emerged from an analysis of these studies by Drs L. Laster and R. Lobene. These are as follows: use of parallel instead of crossover designs (short-duration studies using cross-overs with minimal wash-out periods reduce the validity of the trial); ensure adequate duration of the trial (preferably 30 days when brushing is allowed); use of sufficient number of subjects to ensure statistical power; use of appropriate subjects (those with moderate to high levels of plaque and gingivitis); selection of appropriate negative control (the use of only an active control such as chlorhexidine, makes it difficult to position the effectiveness of an experimental therapeutic agent); and the use of proper statistical methodology. Several short term trials that do include these controls show the efficacy of the individual products.

The review by Dr. Kuftinec et al., of those clinical trials that tested the effectiveness of the regimen, i.e. the use of both the sanguinaria toothpaste and oral rinse, for periods ranging from fourteen days to six months, indicate consistently positive results in the reduction of plaque, gingivitis and bleeding parameters. In these studies, no adverse hard tissue effects, or adverse microbiological shifts in the oral flora were observed except for a single reversible soft tissue effect observed in the 260 subjects. Thus, clinical studies indicate a synergistic effect when an SaE-containing dentifrice and oral rinse are used as a regimen. The reason for the cumulative benefit is a matter of speculation. A proposed explanation suggests that the substantivity of sanguinaria in the oral rinse is increased when preceded by toothbrushing with the SaE-containing dentifrice, either due to the chemical (dentifrice base or pH) or mechanical properties of the sequential procedures.

Dr. S. Ciancio reviewed the impact of chemotherapeutic agents on treatment of periodontal patients. The current armamentaria for plaque reduction consists of chemical, mechanical and irrigation devices. High risk patients with poor plaque control, those with oral appliances, or patients on medications that cause xerostomia or gingival hyperplasia are ideal candidates for the use of chemotherapeutic agents. For these patients an "interrupted" approach, consisting of the use of anti-plaque, anti-gingivitis agents for a period of 2-12 weeks followed by an evaluation of about three weeks when no chemical therapy is used was recommended. Some studies indicate that effective plaque control can minimize hyperplasia that is induced by medications. While many studies indicate that chlorhexidine is highly effective, as an anti-inflammatory topical agent, it failed to reduce plaque volume and the side effects of staining, changes in taste perception and the recent reports about sensitivity reactions are contra-indications for its use.

A comprehensive review of the safety of SaE was presented by a member (V. Frankos) of an Expert Panel which evaluated the acute, subchronic, and chronic toxicity as well as the reproductive, developmental, and genetic data relating to the use of SaE, Sa and oral preparations of these ingredients. In

subchronic studies on monkeys at a dosage of 1000X the estimated usage, no treatment related pathology was detected nor was there any evidence of electrocardiographic effects. The ocular effects associated with the use of the argemone oil, which was hypothesized to be related to its sanguinarine content, has been disproven and is related to some other unknown compound. The data from reproductive and developmental toxicity studies do not indicate any potential health hazard to humans even under "exaggerated" conditions. Chronic oncogenicity studies showed no evidence of neoplastic or preneoplastic lesions. Human clinical investigations did not detect irritation or allergic contact dermatitis. The Panel reviewed 908 consumer case reports and noted some burning or stinging sensation at a rate of about 0.00187% (19 per million). The ingredient responsible for the stinging sensation has not been identified. The conclusion drawn from these studies is that sanguinaria has a 250-fold safety margin between the NOAEL (no adverse effect level) (15 mgs/kg/day) in the sensitive parameters, viz., reproductive and developmental, and the highest anticipated exposure level to SaE (0.060 mg/kg/day), while most regulatory bodies accept a 100-fold safety margin.

Conclusions

The symposium met its objective of updating the current knowledge regarding the efficacy and safety of sanguinaria formulations with emphasis on new, long term clinical investigations. Of particular clinical significance are the consistently positive clinical studies which demonstrate a reduction in plaque and gingivitis scores obtained from long-term use of sanguinaria-containing dentifrice and oral rinse as a sequential regimen. Whatever the mechanism for the synergistic effect, a clear recommendation emerges from the recent studies — the SaE-containing oral products should be used as a regimen.

Quo vadis? The development and marketing of a therapeutic agent, such as SaE, in a dentifrice and rinse formulation introduces a new armamentarium in the reduction and control of the microbial dental plaque and gingivitis. Can one with some credibility draw a parallel between the dramatic reduction

in dental caries following the long-term use of fluoride-containing dentifrices and the introduction of anti-plaque agents? What is the potential for a significant reduction of periodontal disease resulting from the long-term use of these therapeutic regimens? The prospects for a significant reduction in plaque and gingivitis scores are potentially significant based on numerous corroborating studies. But how does this relate to destructive periodontal disease? Gingivitis may be a necessary precursor of periodontal disease but it does not invariably progress to periodontitis. Therein lies the dilemma — for in order to assess the long-term effects of the new technology, as represented by the SaE formulations, it is essential that clinical studies evaluate the effect of the long-term use of anti-plaque, anti-gingivitis agents. Only on the basis of such studies will it be possible to define clearly the contribution of these new technologies, beyond its ability to reduce plaque and gingivitis, to the reduction in the prevalence of periodontitis. ▼

The History, Chemistry and Pharmacokinetics of Sanguinaria Extract

Ronald J. Harkrader, PhD, Atrix Laboratories, Inc.

Paul C. Reinhart, Jack A. Rogers, Richard R. Jones, Robert E. Wylie II, Bryan K. Lowe, and Randy M. McEvoy

ABSTRACT

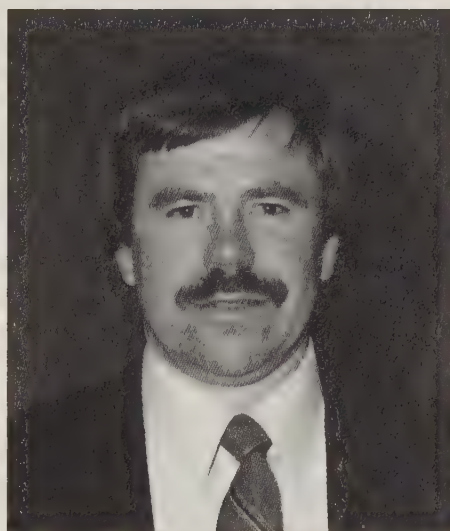
Sanguinaria extract is a mixture of benzophenanthridine alkaloids derived from Sanguinaria canadensis L. (bloodroot). This mixture of alkaloids has a long history of use in tinctures and expectorants in pharmaceutical products. The purity of Sanguinaria extract is well defined. The chemistry and biochemistry of these alkaloids, including the dynamic equilibrium between acid and base forms, and pharmacokinetics of Sanguinaria extract shall be presented when this extract is incorporated into a dentifrice or oral rinse formulation.

Introduction

Sanguinaria extract is an extract from the bloodroot plant, *Sanguinaria canadensis* L. Sanguinaria extract is predominantly composed of six benzophenanthridine alkaloids with sanguinarine as the principal alkaloid. The other alkaloids include chelerythrine, sanguilutine, chelilutine, chelirubine, and sanguirubine (Figure 1). This paper shall present a general introduction to Sanguinaria extract including the sources of the alkaloids which make up the extract and its historical uses, methods of analysis, some general chemistry of the benzophenanthridine alkaloids, the biochemical effects of Sanguinaria extract, and certain aspects of their pharmacokinetics when they are incorporated in an oral rinse and dentifrice.

Sources of Sanguinaria Extract And Historical Uses

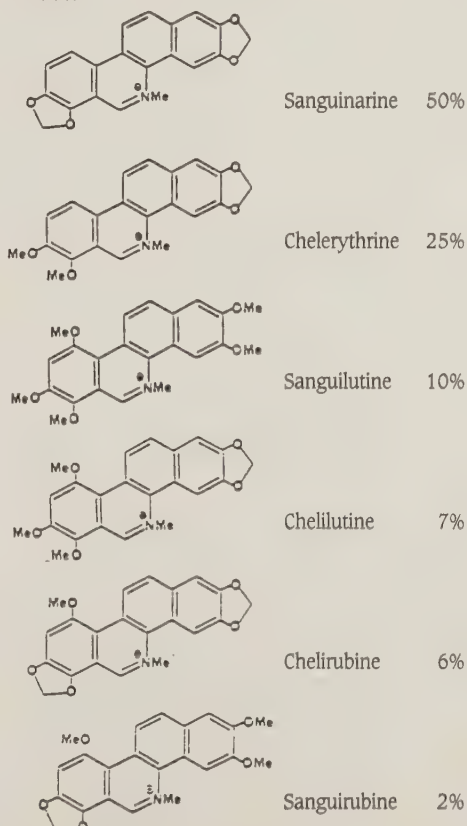
The bloodroot plant is a monotypic genus of the family Papaveraceae. It is a



Ronald J. Harkrader, PhD

Figure 1

Benzophenanthridine Alkaloids in Sanguinaria Extract



herbaceous perennial, native to North America, which can be found in cool, moist, deciduous woods from Quebec to Florida and as far west as the Mississippi River. Both extracts from the bloodroot plant and the rhizome itself have been used medicinally by the Indians since the days of John Smith, dating to 1612¹. Homeopathic and folkloric preparations of *S. canadensis* have been used widely as expectorants and for the treatment of topical infections. Its first recognized use in the United States can be found in the United States Pharmacopoeia as early as 1830². Merck and Eli Lilly were among numerous companies marketing preparations containing Sanguinaria extract (Table 1). Most of these products used extracts or tinctures from the bloodroot plant as expectorants in their cough syrups. Methods for preparation of extracts and tinctures have been reported in the National Formulary and the U.S. Pharmacopoeia³. These crude

TABLE 1

Products Containing Sanguinaria Extract

Product	Manufacturer
Blair Cough Syrup	Chap Stick Company
White Pine Compound	Lilly
Sedatussin	Lilly
Digestone	PMS Products
Syrup Pine and Tar	Barre-National
REM	Block
Creosoted White Pine Compound	Ortho Products
Breacol With Prylon	Sterling Products
Watkins	Watkins
White Pine Compound	Wendt-Bristol
Austins Cough Syrup	Cilvik
Humphreys "G"	Humphreys
OTC Pectoral	Noyes
Kiddie Cough Syrup	Hance, Brown, White
#One Cough Mixture	McConnon & Company
Sedatole	Merck

preparations differ from the purified Sanguinaria extract, the subject of this paper.

Today, the Sanguinaria extract utilized by Vipont Pharmaceutical, Inc. is isolated from the dried bloodroot rhizome by a patented process involving an initial acidified alcohol extraction followed by several purification steps and finally a salt precipitation⁴. The composition of the Sanguinaria extract, including benzophenanthridine alkaloids, is listed in Table 2.

TABLE 2

Composition Of Sanguinaria Extract

Component	Percent By Weight
Sanguinarine	37 to 40
Chelerythrine	16 to 18
Sanguilutine	7 to 9
Chelilutine	3 to 5
Chelirubine	3 to 4
Sanguirubine	0.5 to 1
Zinc	4 to 6
Sodium	4 to 6
Chloride	14 to 17
Water	2 to 3
Insolubles	0.5 to 1

Sanguinarine is the principal alkaloid found in Sanguinaria extract (Figure 2). All of these alkaloids have been isolated and characterized by proton nuclear magnetic resonance (NMR), ultraviolet and infrared spectroscopy, melting point, mass spectrometry, and high performance liquid chromatography (HPLC)^{5, 6, 7, 8}.

Analysis Of Sanguinaria Extract

Several HPLC methods have been developed by our laboratories to analyze Sanguinaria extract for the six benzophenanthridine alkaloids. One method employs a Waters 5-CN Radial Pak column using a mobile phase of methanol/water at pH 4.6⁹. A more sensitive HPLC method with improved chromatographic resolution employs an ethyl column (C2) with a mobile phase composed of acetonitrile/water and two ion-pairing reagents (Figure 3). This HPLC method will detect as little as 28 ng alkaloid. It can be used to evaluate benzophenanthridine alkaloids in biological matrices such as saliva and plaque¹⁰.

Chemistry Of Sanguinaria Extract

Benzophenanthridine alkaloids are

Figure 2

Chemical Structure of Sanguinarine Chloride

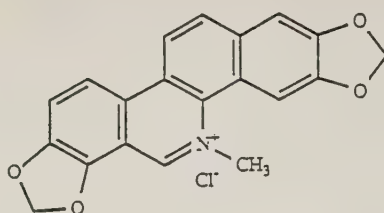
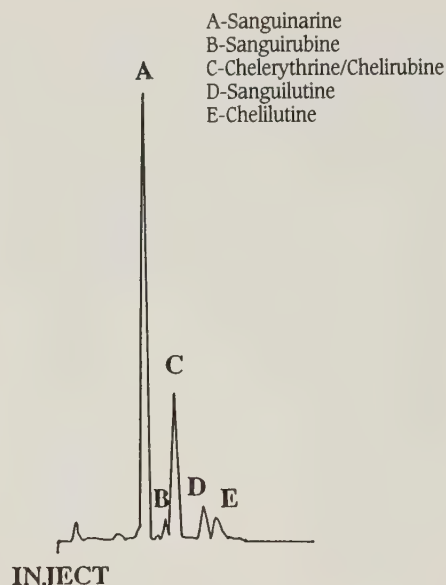


Figure 3

HPLC Analysis Of Sanguinaria Extract Using C2 HPLC Column



highly susceptible to reaction at the iminium ion bond. Some of these types of reactions are discussed. The benzophenanthridine alkaloids found in Sanguinaria extract will undergo an N-demethylation reaction under pyrolytic conditions (200°C) as a powder and in solvents such as methanol at reflux conditions (60-65°C)^{11, 12}. The benzophenanthridine alkaloids are capable of forming dihydro compounds using reducing agents such as NaBH₄. These reactions are reversible either photochemically or by air oxidation. The benzophenanthridine alkaloids were first synthesized in 1968 and chelerythrine was the first synthetically prepared alkaloid^{13, 14}.

Sanguinarine and the other benzophenanthridine alkaloids undergo a dynamic equilibrium between the base form (alkanolamine) and iminium form in any protic solvent (Figure 4)^{15, 16}. This equilibrium is pH dependent for all of the alkaloids present in Sanguinaria extract. It appears that substitution on the rings stabilize or destabilize the formation of the base form^{17, 18, 19}.

In Figure 5, an example of this type of equilibrium for sanguinarine chloride is shown. In Table 3, the pK value for conversion of the iminium ion to a base form has been shown for all of the alkaloids in Sanguinaria extract.

The alkanolamine forms of the benzophenanthridine alkaloids have been reported to be highly lipophilic²⁰. These forms are insoluble in water, but highly soluble in a variety of organic solvents including ethyl acetate, methylene chloride, and toluene.

Figure 4

Iminium Ion (Form I) and Alkanolamine (Form II) Structures of Sanguinarine

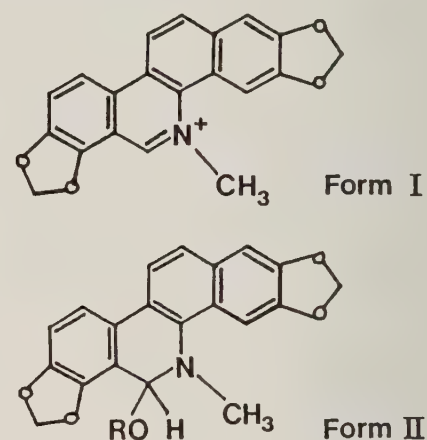


Figure 5

Equilibrium between Iminium Ion Form and Base Form of Sanguinarine pKa=6.6

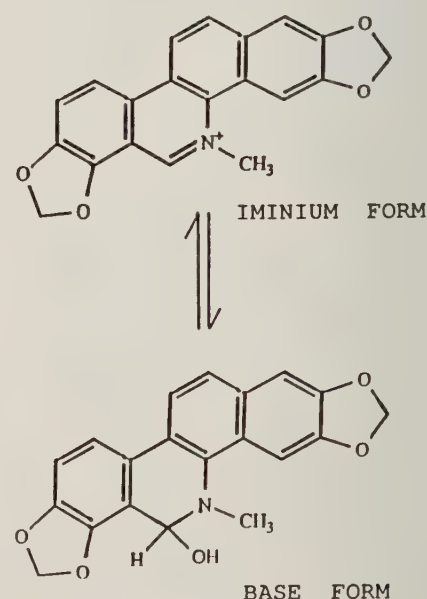


TABLE 3

pK Value For The Conversion Of Benzophenanthridine Alkaloids In Sanguinaria Extract From Iminium Ion To Alkanolamine Form

Alkaloid	pK in Water
Sanguinarine	6.6
Cheferythrine	7.6
Sanguilutine	7.4
Cheilutine	7.2
Cheilirubine	6.4
Sanguirubine	6.5

At a pH equal to pK, 50% of the alkaloid will be in each form.

Biochemistry Of Sanguinaria Extract

The benzophenanthridine alkaloids have been studied for a variety of other biological activities beyond the antiplaque activity of the alkaloids when used in dentifrices and oral rinses. These include antimicrobial, antifungal and anti-inflammatory effects, bone resorption inhibition, and mast cell histamine release inhibition as shown in Table 4²¹⁻³⁰. Dzink and Socransky examined the effects of sanguinarine on oral microbial isolates using a chemically defined medium²². The minimum inhibitory concentration value (MIC) for sanguinarine against these isolates ranged from 1 to 16 µg/ml. The minimum bactericidal concentration for sanguinarine on the majority of isolates

TABLE 4

Pharmacological Activities Of Benzophenanthridine Alkaloids

Antimicrobial
Antifungal
Antiinflammatory
Na ⁺ /K ⁺ ATP'ase Inhibition
Inhibition of Acetyl Cholinesterase
Inhibition of Alanine Aminotransferase
Inhibition of Butyrylcholinesterase
Inhibition of β-glucuronidase
Inhibition of Photophosphorylation
Inhibition of Respiration
Collagenase Inhibition
Bone Resorption Inhibition
Mast Cell Histamine Release Inhibition
Positive Inotropic Agent
Prolongs Ventricular Refractoriness

was within one two-fold dilution. The antifungal properties for sanguinarine have been reported by Vichkanova²³. Simanek and Lenfeld have reported the use of benzophenanthridine alkaloids as

an anti-inflammatory agent. Most of these enzymatic activities such as Na⁺ K⁺ -ATP'ase inhibition have been evaluated *in vitro*. The *in vitro/in vivo* results have been shown for the antimicrobial, antifungal and anti-inflammatory activities²¹⁻³⁰.

Pharmacokinetics Of Sanguinaria Extract In Oral Rinses

The anti-inflammatory, antibacterial, and antifungal properties of the benzophenanthridine alkaloids comprising Sanguinaria extract make it well suited to treat plaque and gingivitis in the oral cavity. This use requires optimizing the delivery of Sanguinaria extract to the oral cavity as well as assuring that the biological activity of Sanguinaria extract is maintained. Southard, et al. found that Sanguinaria extract was retained preferentially by plaque compared to saliva³¹. The pharmacokinetic characterization of Sanguinaria extract and its effectiveness in treating plaque and gingivitis are discussed.

In two studies, the pharmacokinetics and biological effects of oral rinses containing Sanguinaria extract were evaluated. The pharmacokinetics studies were designed to evaluate the effects of Sanguinaria extract dosage, duration of oral rinsing, and effects of oral rinse use on salivary pH. The following biological measurements were used: total benzophenanthridine alkaloids retained in the oral cavity, plaque retention of Sanguinaria extract as total benzophenanthridine alkaloids per gram wet plaque weight 30 minutes after use of the oral rinse. In addition, salivary concentrations of benzophenanthridine alkaloid per ml saliva, and salivary pH and expectorant pH were determined pre-and post-use of the oral rinse.

The initial study evaluated two products: the test product (300 µg/ml Sanguinaria extract with 0.2% zinc chloride at pH 4.5) and a vehicle control (containing no Sanguinaria extract or zinc chloride at pH 4.5). Subjects were administered oral rinse after 48 hours of no oral hygiene.

The rinsing time and number of doses used were divided among four groups of subjects as follows:

- one 15 ml rinse for 15 seconds
- two 15 ml rinses for 15 seconds each
- one 15 ml rinse for 30 seconds
- one 15 ml rinse for 60 seconds

The oral retention of Sanguinaria extract was determined as a percent of the administered dose of the total benzophenanthridine alkaloid. The results are shown in Table 5.

Table 6 shows the results of the retention of sanguinaria extract into wet plaque 30 minutes after oral rinse use. All results are reported on the basis of the dosing regimen.

Table 7 provides results on the saliva concentrations of Sanguinaria extract from use of the oral rinse based upon the dosing regimen.

Additional pharmacokinetic evaluations of Sanguinaria extract in oral rinse were made using a higher concentration of Sanguinaria extract. A rinse was prepared as follows:

Test	= 1200 µg/ml Sanguinaria extract rinse, 0.2% zinc chloride, pH 4.5
Control	= No Sanguinaria extract or zinc chloride, pH 4.5

The rinse was evaluated using the pharmacokinetic and biological measures as described in the previous study. Subjects did not use oral hygiene measures for 48 hours prior to using the oral rinse. The rinsing regimen was 1 x 15 ml dose for 60 seconds with the rinse. The results are reported in Tables 8 and 9 and compared to the 300 µg/ml Sanguinaria extract oral rinse. The biological samples from the control rinses were found to contain less than detectable levels of benzophenanthridine alkaloid.

Figure 6 shows the salivary concentrations of total benzophenanthridine alkaloids at 5, 15, and 35 minutes following the use of oral rinse. They were determined as total benzophenanthridine alkaloid by HPLC.

Changes in salivary pH, expectorant pH and saliva pH after use of the oral rinse are shown in Figure 7.

Pharmacokinetics Of Sanguinaria Extract In Dentifrices

Two dentifrices containing Sanguinaria extract are manufactured, one fluoridated and the other without fluoride. The fluoride dentifrice and the non-fluoride dentifrice were evaluated for retention of Sanguinaria extract in plaque. Table 10 presents the results of several studies on dentifrice formulations containing Sanguinaria extract. All subjects in the reported dentifrice studies

TABLE 5

Percent Of Administered Sanguinaria Extract Dose Retained In The Oral Cavity Following Rinsing With 15 ml Of A 300 µg/ml Sanguinaria Extract pH 4.5 Oral Rinse Containing 0.2% Zinc Chloride

<i>Number Of Rinses</i>	<i>Exposure Time Seconds</i>	<i>% Total Benzophenanthridine Alkaloid Retained</i>	<i>Total µg Alkaloid Retained</i>
1	15	12.7 ± 1.2	354 ± 33
1	30	14.3 ± 2.8	399 ± 78
1	60	19.0 ± 3.3	530 ± 92
2	15 EACH	7.6 ± 3.1	424 ± 184

The control group was evaluated using 2 rinses of placebo rinse for 15 seconds each. All HPLC analyses of control group expectorants showed no alkaloid present.

TABLE 6

Total Benzophenanthridine Alkaloid Retention By Wet Plaque

<i>Number Of Rinses</i>	<i>Exposure Time Seconds</i>	<i>Total Benzophenanthridine Alkaloid µg/g Wet Plaque</i>
1	15	33.3 ± 15.8
1	30	55.0 ± 18.4
1	60	85.2 ± 16.3
2	15 EACH	61.5 ± 24.1

Control rinse plaque samples contained less than 0.1 µg benzophenanthridine alkaloid /g wet plaque weight.

TABLE 7

Total Benzophenanthridine Alkaloid In Whole Saliva 5 Minutes After Oral Rinse Use

<i>Number Of Rinses</i>	<i>Exposure Time Seconds</i>	<i>Total Benzophenanthridine Alkaloid µg/ml</i>
1	15	2.3 ± 1.2
1	30	3.0 ± 1.5
1	60	5.4 ± 2.5
2	15 EACH	3.4 ± 1.8

Control rinse saliva samples contained less than 0.1 µg/ml alkaloid.

TABLE 8

Percent Total Benzophenanthridine Alkaloid Retained In The Oral Cavity From Administration Of 15 ml Oral Rinse

<i>Product µg/ml</i>	<i>% Total Benzophenanthridine Alkaloid Retained</i>	<i>Total µg Alkaloid Retained</i>
300	19.0 ± 3.3	530 ± 92
1200	18.6 ± 7.5	2075 ± 837

TABLE 9

Total Benzophenanthridine Alkaloid Retained In Wet Plaque

<i>Product µg/ml</i>	<i>Total Benzophenanthridine Alkaloid µg/g Wet Plaque</i>
300	85 ± 16
1200	242 ± 86

brushed for one minute with 2.0g of dentifrice which contained 750 µg Sanguinaria extract per gram of dentifrice. Plaque samples were taken 45 minutes after use of the dentifrice. These subjects had abstained from oral hygiene practices for four days prior to use of the dentifrice.

Discussion

The oral rinse studies indicated the retention of Sanguinaria extract in the oral cavity was improved with a longer rinsing time (60 seconds). The retention of benzophenanthridine alkaloids in plaque was optimized with a sixty second rinse time. The 2 rinses for 15 seconds each had comparable saliva concentrations of benzophenanthridine alkaloids to the 30 second rinse time. Plaque retention of Sanguinaria extract was equivalent for 1 rinse for 60 seconds or two rinses for 15 seconds each with the pH 4.5 oral rinse. However, twice the amount of oral rinse was required in the latter group to achieve the same plaque retention of alkaloid as the single-rinse group for a 60 second rinse. The data suggest an explanation for the reduced level of Sanguinaria extract found in saliva as being due to a shifted equilibrium between the plaque and saliva because of the high affinity of Sanguinaria extract for plaque. The larger dosage of Sanguinaria extract in the oral rinse increased proportionately the concentration of benzophenanthridine alkaloids retained in the plaque.

Saliva concentrations of Sanguinaria extract increased proportionately to the dosage of Sanguinaria extract in the rinse. The expectorant pH drops no lower than pH 5.5 with the 300 µg/ml oral rinse. Additionally, the salivary pH rapidly recovers as can be observed from the 5 minute post rinse values.

There are several interesting observations to be made from the plaque retention studies on dentifrice formulations. There appears to be either a dentifrice pH effect which increases the retention of sanguinarine in plaque, or the formulation base may change the alkaloid retention. Silica-based dentifrices may improve the plaque retention of sanguinarine. The other benzophenanthridine alkaloid concentrations were also increased in the plaque. Fluoride does not appear to influence the plaque retention of sanguinarine.

TABLE 10

Retention Of Sanguinarine In Wet Plaque From Sanguinaria Extract Dentifrice Formulations

Product	Type Of Dentifrice	pH	$\mu\text{g/g}$ Wet Plaque
Marketed	Dicalcium Phosphate Non-Fluoride	5.1	3.9 ± 1.9
Marketed Fluoride	Silica Base with Fluoride	6.2	9.7 ± 3.6
Non-Fluoride	Silica Base	6.1	10.8 ± 4.5
High pH Fluoride	Silica Base with Fluoride	6.9	11.1 ± 4.3

Figure 6

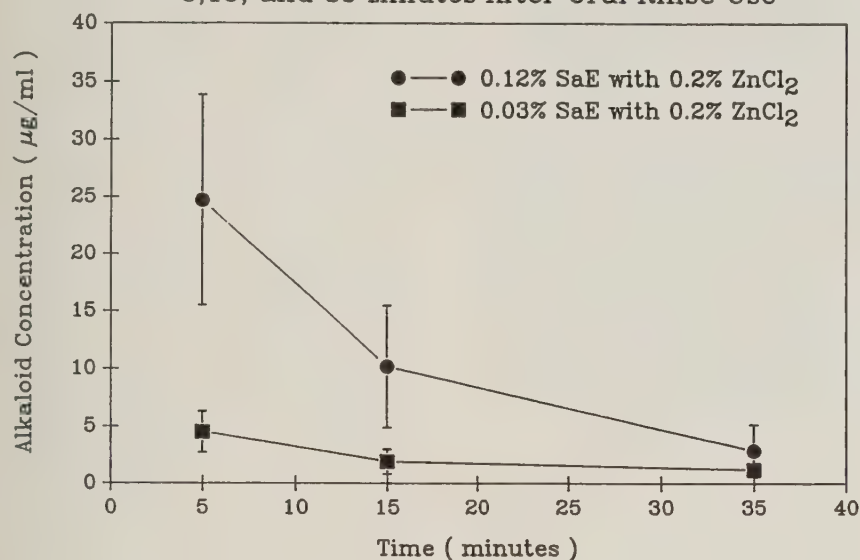
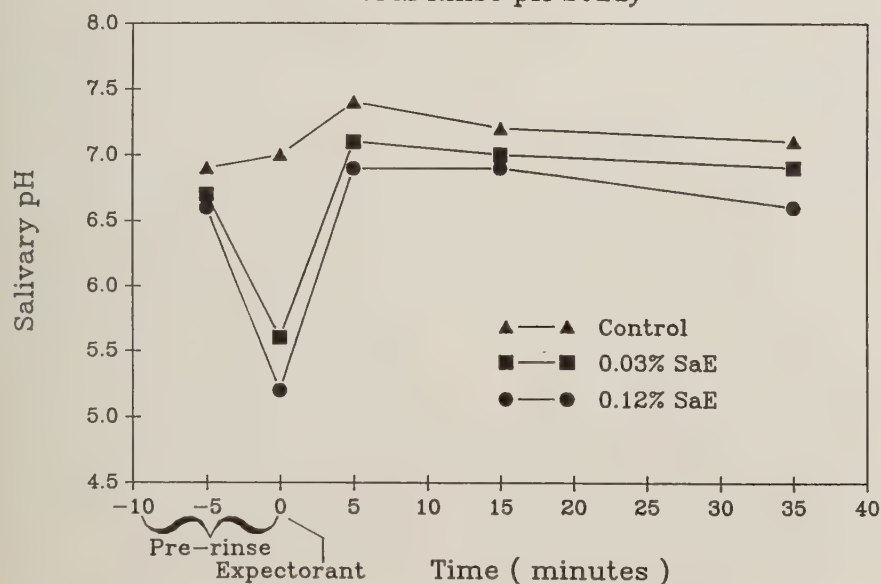
Total Benzophenanthridine Alkaloid Concentration in Saliva
5, 15, and 35 Minutes After Oral Rinse Use

Figure 7

Salivary pH Results
Oral Rinse pH Study

Conclusion

Sanguinaria extract has had a long history of use in the United States. Over the past three decades the interest in the benzophenanthridine alkaloids comprising Sanguinaria extract has intensified partially as a result of the improved methods for detection and separation. Studies on the chemistry, biochemistry, and biological activity have increased as well. These benzophenanthridine alkaloids undergo a unique and complex acid/base chemistry which may be one of reasons for their biological activity. The acid/base chemistry provides a challenge for their use in product formulation.

The pharmacokinetics of Sanguinaria extract have been studied for several years by our laboratories. These studies demonstrate that sanguinaria extract has a high affinity for plaque compared to saliva. When higher dosages of Sanguinaria extract were used in the oral rinse, plaque retention of Sanguinaria extract did not appear to reach saturation.

The dentifrice pharmacokinetics have demonstrated that Sanguinaria extract retention in plaque was affected by the dentifrice base and pH. The effects of dentifrice base and pH are continuing to be evaluated.

The pharmacokinetic evaluations have been performed by HPLC analysis of samples obtained from the biological matrices. These studies demonstrate concentrations of Sanguinaria extract found in these samples were sufficient to inhibit plaque. The antimicrobial effects of Sanguinaria extract, once it is present and bound to plaque and saliva, is the subject of a subsequent paper. ▼

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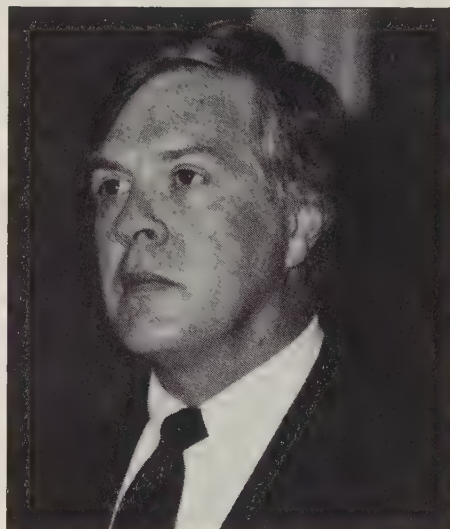
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Effects Of Sanguinarine And Sanguinaria Extract On The Microbiota Associated With The Oral Cavity

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The beneficial contributions of oral hygiene to one's overall health were recognized long before there was any indication that microorganisms and dental plaque existed. There is evidence to indicate that man has been concerned with cleaning his teeth for at least the past 5000 years. Devices of gold and ivory resembling tooth picks dating back to 3000 B.C. have been found in the tombs of the ancient Sumerians. Oral rinsing as a formal practice for the treatment of diseases of the gums was practiced in Chinese medicine as early as 2700 B.C. The writings of both Pliny and Hippocrates document the custom of rinsing the mouth as a means of cleansing the teeth among the Roman upper class. Even then, there was disagreement concerning which mouthrinse formulation was the most effective. Hippocrates favored a mixture of salt, alum, and vinegar while Pliny recommended the use of salty water in uneven mouthfuls¹. Mechanical tooth cleaning followed by rinsing of the mouth were established practices among the more well-to-do in European society by the 16th century. The *Zene Artzney*, published in Germany in 1530, contained information pertaining to cleansing and washing the teeth with the recommendation to always wash the mouth with beer or wine after eating as a means to remove food that might adhere to the teeth and make them decay and produce bad odor. In the mid-1800s, the intellectual collaboration between Pasteur and Lister led to the recognition that surgical sepsis was due to the presence of living organisms, too small to be seen by the eye. This recognition became the basis for the use of antiseptics for the prevention of post-surgical infections. The concept of the use of antiseptics for the prevention of disease was quickly applied to



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mouthrinses. W. D. Miller wrote in 1890 that "The fact that decay of the teeth is of parasitic origin having been established, we ought to be able by means of properly chosen antiseptic materials not only to arrest decay, but to prevent its appearance. This is, indeed, the avowed object of the very many antiseptic mouthrinses now in the market."²

As may be gathered from the above, neither the concept of cleansing the mouth nor the incorporation of antimicrobial compounds into mouthrinses is a novel idea. Although various antimicrobial and antiseptic agents have been incorporated in oral rinse formulations in the past 100 years, sanguinaria, derived from the bloodroot plant, *Sanguinaria canadensis*, has only been used for this purpose in recent years. However, the use of plants and herbs have been thought beneficial to oral health for centuries. It is written that Mohammed commanded his followers to clean their teeth with toothsticks made from specific plants³. The Chinese have long used teas prepared from certain herbs for their properties in cleaning the

teeth and preventing oral diseases. Chewing sticks, such as those used in Nigeria, have been beneficial to various native cultures as an aid to oral hygiene. It is interesting to note that the Nigerian chewing stick contains a plant alkaloid, fagaronine, which is structurally similar to sanguinarine, the principal component found in the sanguinaria extract.

Sanguinaria extract (SaE) is prepared by an alcoholic extraction of the powdered rhizomes of *Sanguinaria canadensis*, followed by a series of precipitation and purification steps. This process yields a bright orange dry powder which contains a mixture of benzophenanthridine alkaloids, of which sanguinarine is the principal component. SaE and sanguinarine have a wide spectrum of antimicrobial activity against both gram-positive and gram-negative microorganisms as well as yeasts. SaE has been incorporated along with zinc chloride (ZnCl₂) into a dentifrice and a mouthrinse as an antiplaque, antigingivitis agent and has been subjected to numerous short and long-term trials which have demonstrated its effectiveness against oral bacteria.

The purpose of this paper is to review the antimicrobial effects that have been observed with SaE and/or sanguinarine based on recently published and unpublished *in vitro* and *in vivo* data. The paper will also present some proposed modes of action which may account for the antimicrobial activity observed for these compounds against bacteria in general.

***In Vitro* Studies**

Several studies have reported broad spectrum antimicrobial activity for various plant alkaloids, including sanguinarine, against a wide variety of

microorganisms which included bacteria, fungi, yeasts, and phages⁴⁻⁸. However, the first comprehensive study designed to determine the effects of sanguinarine against oral bacteria was performed by Dzink and Socransky⁹. These investigators determined the minimum inhibitory concentrations (MICs), the lowest concentration of an agent that will prevent the growth of an organism, and the minimum bactericidal concentrations (MBCs), the lowest concentration which will kill the organism, for 52 oral reference strains and 129 fresh oral isolates against sanguinarine. These results are summarized in Table 1.

Sanguinarine was found to completely inhibit the growth of 98% of the organisms tested at a concentration ≤ 16 $\mu\text{g/ml}$. Only *Peptococcus prevotii* and *Wolinella succinogenes*, two strains each, demonstrated elevated MICs of 32 $\mu\text{g/ml}$. A comparison of the MBC values to MICs for most of the bacteria reveals that the minimum concentration required to kill the organism was either the same or two-fold higher than the amount that inhibited the growth of the organism. This indicates a bactericidal rather than a strictly bacteriostatic effect. Similar results have been obtained by Godowski, et al. (unpublished data) for various gram-positive and gram-negative oral bacteria including suspected periodontal pathogens. In most instances, MBC values approximated the MIC values.

Since sanguinarine is inhibitory for oral bacteria at relatively low concentrations *in vitro*, it is of interest to know what concentrations are achieved in the oral cavity and how long therapeutic levels are maintained. Boulware, et al.¹⁰ measured the amount of sanguinarine present in supragingival plaque following an oral rinse containing 0.03% SaE. The subjects refrained from all oral hygiene for 4 days prior to the study. On the morning of the 5th day, the subjects rinsed with water to remove large food particles, and plaque was collected for baseline measurements. The subjects then rinsed twice with 15 ml of the oral rinse for 15 sec each. Plaque was collected at 15, 45, 90, 180, and 360 minutes after rinsing. The plaque was assayed for sanguinarine in μg per g of wet plaque. As shown in Fig. 1, sanguinarine concentrations were in excess of 20 μg per g of plaque for up to 3 h following use of the SaE-containing rinse.

TABLE 1

In vitro susceptibilities of oral bacteria to sanguinarine, the principle alkaloid in sanguinaria extract.

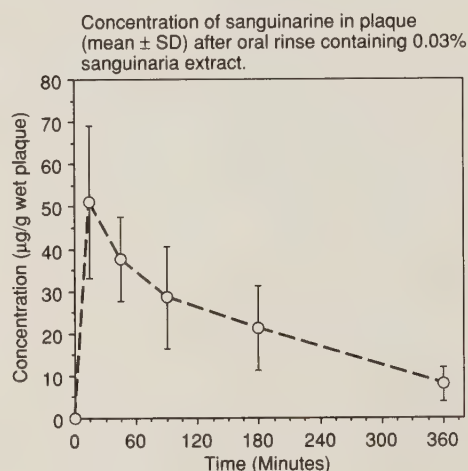
Bacterial taxa	MIC ^a ($\mu\text{g/ml}$)	Range MBC ^b ($\mu\text{g/ml}$)
<i>Actinobacillus actinomycetemcomitans</i>	8-16	16-32
<i>Bacteroides</i> (including <i>P. gingivalis</i> ^c)	1-16	1-16
<i>Capnocytophaga</i>	1-4	2-4
<i>Campylobacter</i>	1-16	1-16
<i>Eikenella corrodens</i>	8-16	8-16
<i>Eubacterium</i>	1-16	2-16
<i>Fusobacterium nucleatum</i>	1-4	4
<i>Peptococcus</i>	4-32	4-32
<i>Peptostreptococcus</i>	4-8	4-32
<i>Selenomonas sputigena</i>	2-8	2-8
<i>Streptococcus intermedius</i>	1-8	2-8
<i>Wolinella</i>	4-32	4-128
<i>Actinomyces</i>	1-8	1-16
<i>Arachnia propionica</i>	4-8	8-16
<i>Bacterionema matruchotii</i>	4	8
<i>Bifidobacterium</i>	2-16	2-16
<i>Lactobacillus</i>	2-8	2-8
<i>Leptotrichis buccalis</i>	8	16
<i>Propionibacterium</i>	1-8	2-8
<i>Streptococcus</i>	1-8	2-8
<i>Staphylococcus</i>	4-16	4-16

a Minimum inhibitory concentration

b Minimum bactericidal concentration

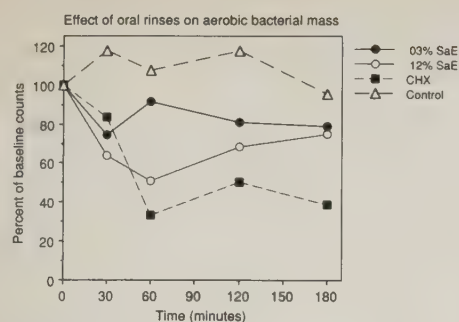
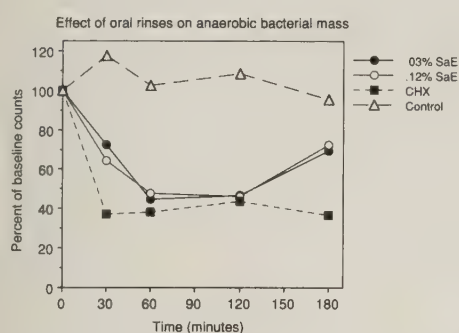
c *Porphyromonas gingivalis* (formerly *Bacteroides gingivalis*)

FIGURE 1



A comparison of these data with those of Dzink and Socransky indicates that sanguinarine is retained in the plaque for a minimum of 3 h after rinsing at levels in excess of the MIC, and often the MBC, for most oral bacteria. Sanguinarine concentrations in the saliva were also measured in the Boulware study and were found to be relatively low (<1.5 $\mu\text{g/ml}$). This provides evidence that sanguinarine must bind to and be retained in dental plaque for several hours following oral rinsing.

Since sanguinarine is retained in plaque at concentrations often in excess of bactericidal levels for many of the associated bacteria, one would expect to see decreases in bacterial mass following oral rinses containing SaE. This theory was recently tested by Godowski, et al.¹¹ and unpublished data). A total of 32 subjects were given a thorough dental polishing and instructed to refrain from all oral hygiene for 48 h. After this time, the subjects were randomly assigned to 4 rinse groups consisting of (a) Viadent oral rinse containing 0.03% SaE and 0.2% ZnCl_2 , (b) an oral rinse similar to the previous except the formulation contained 0.12% SaE but no ZnCl_2 , (c) Peridex oral rinse containing 0.12% chlorhexidine (CHX), and (d) Viadent vehicle control without SaE or ZnCl_2 . Plaque samples were collected prior to rinsing and at 30, 60, 120, and 180 minutes after rinsing. Total aerobic and anaerobic counts were enumerated for each sample. The results are summarized in Fig. 2a and 2b respectively. Due to variation in the baseline means between groups and for ease in understanding, the data have been converted to percent of total counts recovered,

FIGURE 2a**FIGURE 2b**

with mean baseline counts within a group arbitrarily represented as 100%. As shown in Fig 2a, the chlorhexidine-containing rinse had a much more dramatic effect on total aerobic counts than either the SaE/ZnCl₂ or 0.12% SaE-containing rinses. However, as shown in Fig 2b, both the SaE/ZnCl₂ and the 0.12% SaE-containing rinses resulted in a 50-55% reduction in the anaerobic bacteria at 1 and 2 h after rinsing and gave results comparable to the chlorhexidine-containing rinse at these times. Chlorhexidine appeared to have a quicker and more long-lasting effect than either of the SaE rinses in that it produced a 60% decrease within 30 minutes after rinsing and maintained this level for up to 3 h. The ability of the SaE rinses to drastically decrease the anaerobes without a corresponding decrease in the aerobic bacteria is probably an advantage. In heavy plaque, anaerobic bacteria tend to outnumber the aerobes on the order of 5-10 to 1. The presence of the aerobes may be important in preventing colonization by opportunistic pathogens such as yeast or in preventing the overgrowth by the anaerobes that remain.

Modes of Action

Most compounds with antibacterial activity that have been incorporated into mouthrinse formulations, eg., chlorhexidine, phenolic compounds, quaternary ammonium compounds, etc.,

exert their effect on the bacterial cell by binding to cell membranes. This produces alterations in the permeability of the bacterial membrane and results in the leakage of intracellular components along with protein denaturation and coagulation of cytoplasmic contents which eventually leads to cell death¹².

The mechanism(s) by which sanguinarine and SaE inhibit and kill bacterial cells is not fully understood but appears to differ from that employed by the above antibacterial compounds. The study by Boulware, et al. indicates that sanguinarine is reversibly bound to existing dental plaque. This may indicate that receptors exist either on the bacteria or on the tooth surface that bind sanguinarine. There is some evidence to support this theory. Studies by Babu, et al.¹³ have reported that treatment of artificial tooth pellicles with SaE-containing oral rinses decreases the ability of certain streptococci and actinomyces to adhere or attach to the artificial tooth surface. The inhibition varies considerably depending on the strain and the organism used. The percent inhibition obtained ranges from a low of <0.5% for *Streptococcus mutans* strain OMZ-176 to 49% for *S. mutans* 6715; *Actinomyces naeslundii* and *S. sanguis* were inhibited 30 and 81%, respectively. In this study, the artificial tooth surface was treated with the SaE-containing rinse prior to the introduction of the microorganisms. In another study, Babu and co-workers treated the same bacteria with SaE-rinse prior to introducing them to the artificial tooth surface. In the latter, they still found an inhibition in the ability of the microorganisms to adhere to the tooth surface. *S. mutans* OMZ-176 again had the lowest level of inhibition at <1%; *S. mutans* 6715 demonstrated a 41% inhibition, *S. sanguis* and *A. naeslundii* were inhibited 25-30%. Although based on a limited number of bacteria tested, these studies indicate that sanguinarine or some other component of SaE may block, at least partially, specific receptors on both the tooth surface and the bacterial cell that are involved in bacterial adherence to the tooth. It would be interesting to see this concept applied to a wider range of bacteria which included organisms associated with gingivitis and destructive periodontal disease.

Although the above effect on adherence is of great interest and is a very

desirable property to have in an oral rinse, it does not explain the killing mechanism associated with SaE. Based on several separate studies, it appears that sanguinarine as well as other alkaloids contained in SaE exert their effect on the bacterial cell wall and on the formation of the cell wall septum which is formed when bacterial cells divide. Beekov et al.¹⁴ exposed both cultures of *Staphylococcus aureus* and *Pseudomonas aeruginosa* to a 1:1 mixture of sanguinarine and chelerythrine, an alkaloid also present in SaE. These cultures, in log phase growth, were exposed to concentrations of 4-8 and 64-128 µg/ml, respectively. The cells were then examined by transmission electron microscopy. A breakdown of the inner electron dense region of the cell wall was observed in *S. aureus* cells treated with 4 µg/ml. Deformed septa were noted between daughter cells undergoing division. Cells treated with 8 µg/ml showed even more destruction. The electron dense inner region of the cell wall had disappeared, the cell walls were thinner, cell diameter had increased, electron transparent regions were present in the cytoplasm, and some protoplast cells were observed. Similar results were obtained for *P. aeruginosa* at 64 and 128 µg/ml. Godowski, et al.¹⁵ have found similar results. *S. aureus* was grown in brain heart infusion broth, a nutrient-rich medium, with and without 2 µg of sanguinarine per ml of medium. Both the control and the sanguinarine-treated cells were examined by both transmission and scanning electron microscopy. The control cells appeared normal and showed no deformities. The sanguinarine-treated cells had irregular shapes, lacked septum formation between daughter cells, and had a noticeably thinner cell wall. Scanning electron microscopy by Falcolini, et al.¹⁶ of surface films of plaque taken after four one-minute administrations of an 0.03% SaE oral rinse given over a 2 day period gave similar results. These studies tend to confirm each other and indicate that sanguinarine and SaE exert a bactericidal effect on the bacterial cell by interfering with some essential step in the synthesis of the cell wall and the cell septum.

In Vivo Studies

In the past few years, there have been several clinical trials involving the dual

use of an SaE-containing dentifrice and mouthrinse together. These studies have determined the quantitative effects of the dentifrice and oral rinse on clinical indices associated with plaque accumulation and gingivitis and on the bacteria involved. These have included studies by Harper, et al.¹⁷, Kopczyk, et al.¹⁸, and Palcanis, et al.¹⁹.

Microbiologically, the study by the Fairleigh Dickinson group of Harper, Gordon, Fine, and Mueller was extremely thorough in that microbial samples were individually collected from both the supragingival and subgingival plaque, the buccal mucosa, and the tongue and assayed for both safety and efficacy of the products. The examiners determined the effects of the combined use of a dentifrice, containing 0.075% SaE and 2.0% ZnCl₂, and an oral rinse, containing 0.03% SaE and 0.2% ZnCl₂, in a six-month, double blind study. Sixty subjects were randomly assigned to either the test group or a placebo control group. The placebo contained the same formulation as the product dentifrice and rinse with the exception of SaE and 0.2% ZnCl₂. The dentifrice and rinse were used twice daily in a combined use regimen. Bacteriological samples were collected at baseline, and after 14 and 28 weeks of use of the products. Plaque samples were collected from the mesiobuccal surfaces of the sample teeth at baseline and 28 weeks and from the distobuccal surfaces at 14 weeks. The latter surfaces were used to minimize disturbance of the plaque to be collected at 28 weeks. Microbial samples were processed and plated on selective and non-selective media to determine bacterial mass, organisms associated with dental health and disease, and levels of potentially opportunistic pathogens. Since an undesirable side-effect of the use of any antimicrobial agent is possible emergence of opportunistic pathogens following the suppression or elimination of the normal flora, microbial evaluations of safety as well as efficacy were made. The results are summarized below. (All bacterial counts have been expressed as log base 2 due to the numerical range being covered. For the reader's convenience, Table 2 gives the nearest whole number for log base 2 values.)

TABLE 2

Relation of numbers converted to log base 2 to actual bacterial counts

Log base 2	Corresponding number*
20	485,165,195
19	178,482,301
18	65,659,969
17	24,154,953
16	8,886,111
15	3,269,017
14	1,202,604
13	442,413
12	162,755
11	59,874
10	22,026
9	8,103
8	2,981
7	1,097
6	403
5	148
4	55
3	20
2	7
1	3

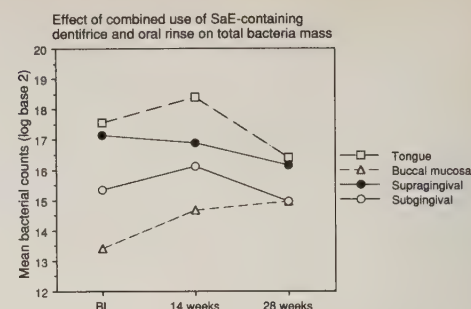
* Rounded to nearest whole number

In vivo effect on bacteria

Total bacterial counts were determined from tongue, buccal mucosa, and the supra- and subgingival plaque for all sample times. The results are summarized in Fig. 3a and Fig. 3b. Counts obtained from both the tongue and the subgingival plaque in the SaE product group (Fig. 3a) were higher than baseline after 14 weeks but less than baseline at 28 weeks. A similar increase was noted with the non-SaE containing controls (Fig. 3b) at 14 weeks without an accompanying decrease below baseline at 28 weeks. However, the differences between the SaE group and the control group are not statistically significant and are probably due to natural fluctuation.

Examination of the data sets for the buccal mucosa reveals that there was an increase in the number of bacteria recovered from the SaE group but a decrease in the number recovered from the control group. However, there is no difference between the SaE and control groups at 28 weeks (the mean of each group was approximately 3×10^6 CFUs). It is likely that a few subjects in each group had relatively high or low counts that tended to skew the mean.

FIGURES 3a



FIGURES 3b

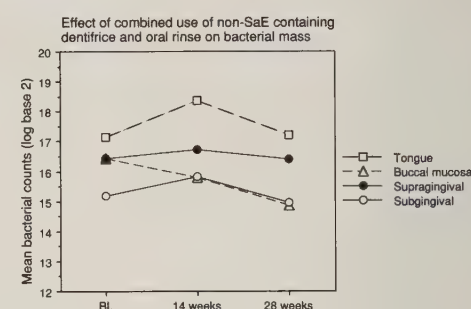
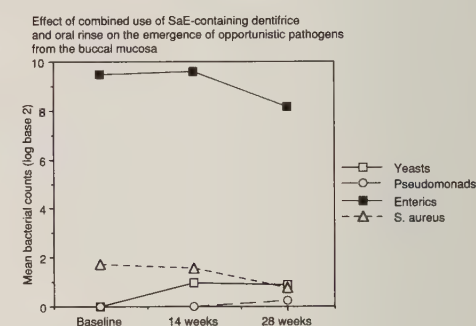


FIGURE 4



An examination of Fig. 4 reveals that there was no increase over time in the number of potential opportunistic pathogens recovered from the SaE group.

A slight but steady decrease was noted in means of the counts obtained from the SaE group for the supragingival plaque (Fig. 3a) but not for the control group (Fig. 3b). The means of the SaE group were approximately 28×10^6 , 21×10^6 , and 10×10^6 at baseline, 14, and 28 weeks, respectively. These figures represent a 58% decrease in the mean count from baseline to 28 weeks. It is possible that a decrease in the bacteria associated with the supragingival plaque may result in the suppression of the normal flora and allow undesirable bacteria such as suspected periodontal pathogens and/or opportunistic pathogens to colonize and proliferate. The effect of the usage of the SaE-containing

products on gram-negative anaerobes and on specific bacterial groups that have been associated with destructive periodontal disease is summarized in Fig. 5a. The line slope of the means of all four of these groups is similar to that in Fig. 3a for the effect on the supragingival plaque. All four groups demonstrated a steady decrease in mean values over time. The mean of the total gram-negative anaerobes was around 3×10^6 , 1.8×10^6 , and 0.5×10^6 at baseline, 14, and 28 weeks respectively. This represents an 83% decrease from baseline to 28 weeks. Decreases of 96%, 88%, and 65% were noted in the mean values from baseline to 28 weeks for capnocytophaga, fusobacteria, and black-pigmenting *Bacteroides*, respectively. The mean values for these taxa in the control group showed little if any change (Fig. 5b).

Reputed opportunistic pathogens, eg. enteric bacteria, yeasts, pseudomonas, and staphylococci, were enumerated on selective media to determine if these taxa increased during the period of SaE product use. As can be seen in Fig. 6, there was no increase in any of these taxa. Pseudomonas was never detected at any sample period and was not shown in figure. The decrease in the mean values of the enteric group from baseline to 28 weeks was significant at $p \leq 0.05$.

Conclusions

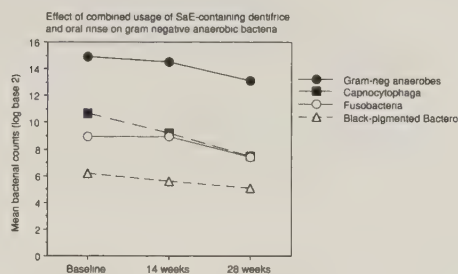
In vitro studies have demonstrated that sanguinarine in sanguinaria extract is both bacteriostatic and bactericidal for the majority of bacteria encountered in the oral cavity. Plaque concentrations of sanguinarine, inhibitory for most oral bacteria, are achieved and maintained for several hours following an oral rinse containing 0.03% SaE. Preliminary data indicate that SaE may interfere with the adherence of certain bacteria to the tooth surface by blocking specific receptors either on the bacteria or on the tooth pellicle.

Sanguinarine and possibly other alkaloids in SaE appear to interfere with the synthesis of the bacterial cell wall and the formation of septa during bacterial division.

In vivo studies have documented that the combined use of SaE-containing dentifrice and oral rinse results in a decrease in the bacterial mass associated with supragingival plaque. These studies have shown that the combined usage of

the dentifrice and rinse are safe over a 6-month period and do not lead to the colonization or proliferation of either opportunistic or periodontal pathogens. ▼

FIGURES 5a



FIGURES 5b

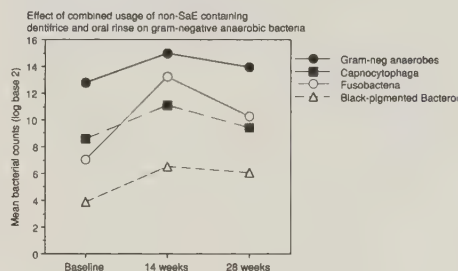
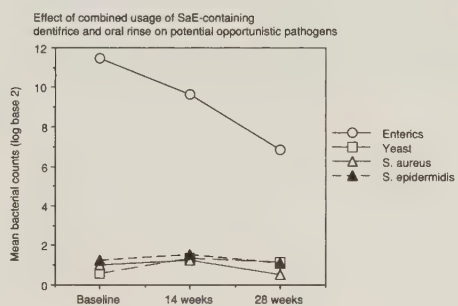


FIGURE 6



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New Perspectives On Sanguinaria Clinicals: Individual Toothpaste And Oral Rinse Testing

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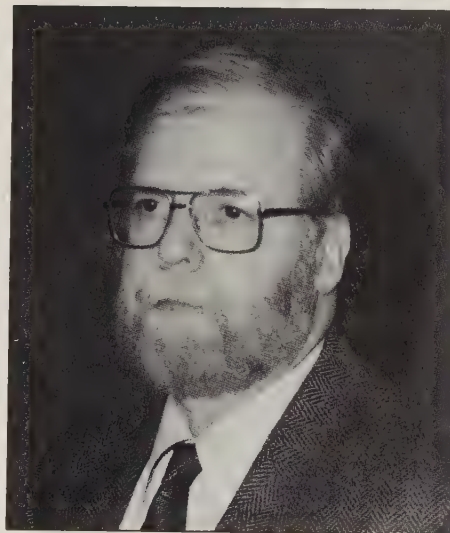
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ABSTRACT

Clinical studies conducted since 1983 on oral care products containing sanguinaria extract have yielded a variety of results. A careful review of these trials suggests that the designs used to conduct many of these trials may have had affected the study outcomes. Review of these trials suggests that studies testing the efficacy of anti-plaque products exercise the following guidelines: 1) use parallel instead of crossover designs, 2) select appropriate study populations, 3) use sufficient numbers of subjects to ensure statistical power, 4) select appropriate controls, 5) ensure intra- or inter-rater reliability prior to the start of the study, and 6) use proper statistical methodology. This review was undertaken to provide perspective into the results of these early studies, and furnish the rationale for the planning of subsequent clinical testing of sanguinaria-containing products.

Introduction

Since 1983, numerous studies have been conducted using dental care products containing sanguinaria extract. These studies have been of varying duration and study design, and have yielded mixed results. Seventeen clinical trials reported in the literature yielded positive results. Ten of those trials, which focus on the individual testing of toothpaste and oral rinse, will be reviewed here. The remaining seven trials will be reported in a subsequent presentation. Thirteen clinical trials reported in the literature have yielded mixed or negative results with various sanguinaria formulations and all of them will be considered here. A careful



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review of these trials will provide insight into the effects that the various clinical designs had on the analyses and subsequent conclusions that were drawn.

Short-Term Trials (fewer than 30 days)

The experimental gingivitis model, when applied appropriately, has been successful in showing statistically significant differences between sanguinaria-containing oral rinses and placebo preparations in the inhibition of plaque and gingivitis. Five positive short-term studies are reported in the literature. Of importance is the fact that four of these studies continued for 14 days, at which point significant differences were detectable for both parameters. The fifth study was only one week in duration, but the subjects used the products five times daily in an exaggerated use model making differences observable at an earlier point.

The exaggerated use model was conducted by Yankell and reported by Southard and others¹ primarily to establish the safety of the oral rinse in

terms of oral mucosa irritation when used five times each day. Eighteen subjects completed the trial, after one week's use of either the marketed oral rinse, an experimental formula with 50% more sanguinaria, or a placebo oral rinse with no sanguinaria or zinc chloride. No adverse reactions were observed. In addition, the researchers measured plaque area and observed statistically significant differences among the groups demonstrating reductions in plaque for the sanguinaria products.

Wennström and Lindhe² employed a two-week, twice-daily use model to compare the marketed oral rinse to a placebo preparation. There was a three-month washout period between test phases in this crossover design. Fourteen subjects completed the trial and no carryover effect was observed. For the 14 subjects completing the trial, statistically significant differences for plaque and gingivitis were observed at 14 days, and darkfield microscopy revealed that the subjects in the sanguinaria phase had significantly fewer filaments, motile rods and spirochetes.

The study reported by Wennström and Lindhe was repeated by Southard, et al.³ with modification. The results obtained in the marketed rinse and placebo cells closely approximated the results obtained by Wennström and Lindhe.²

Two other experimental gingivitis studies evaluating oral irrigation also included rinsing only with the sanguinaria rinse as one of the groups.

Parsons et al.,⁴ in a three-group comparison, tested irrigation with water, irrigation with a 0.00225% sanguinaria solution of marketed product in water, and manual rinsing with the marketed product. Forty-four

subjects entered this parallel design study with moderate levels of plaque and gingivitis. Sanguinaria-containing products significantly inhibited the formation of plaque compared to irrigation with water. While irrigation greatly reduced gingivitis in this trial (73.3% with water only), sanguinaria manual rinsing also reduced gingivitis by almost 30% over the two week period.

The second of these two studies⁵ included subjects who had minimal plaque and gingivitis. Thirteen subjects participated in a crossover design with washout periods of 4-6 weeks. Test phases consisted of 1) manual rinsing with a placebo rinse, 2) manual rinsing with the marketed product, 3) irrigation with a 0.00225% solution of sanguinaria oral rinse in water, and 4) irrigating with a 0.009% concentration of sanguinaria oral rinse in water. No carryover effect was observed. Use of the sanguinaria-containing products, whether in a manual rinse or delivered by an irrigator, reduced plaque and gingivitis significantly better than the placebo rinse with improvements ranging from 34% to 75%.

These five studies confirm that significant differences from placebo can be detected with the use of sanguinaria in experimental gingivitis studies as long as the duration of the trial is at least 14 days and there is an adequate washout period between test phases in a crossover model.

Five of the twelve clinical trials which showed negative or mixed results were experimental gingivitis trials using multiple crossovers. Such designs have the potential for producing confounded effects. Subjects in these studies are required by design to adjust to the demands of several test regimens. As a result of these adjustments, they may well become less representative of the general population. These studies also involved a variety of active and control products, many of which were the investigators' own formulations. As described in another paper,⁶ sanguinaria formulations require considerable care to prevent inactivation. In addition, these studies allowed only a two to nine day washout between test periods. The number of subjects ranged from 3 to 22. In all five of these trials, there was no report of any test to evaluate the possible carry-over effect from one test phase to another. It is generally ac-

cepted that antimicrobials will create a sustained effect on plaque and/or gingivitis which can be detected by lower entering scores in the subsequent phases of a crossover trial. This has been demonstrated for products containing sanguinaria. Thus a test of carry-over effects is essential in such designs.

The first of these trials, reported by Abbas et al. in 1985,⁷ tested sanguinaria oral rinse against 0.2% chlorhexidine oral rinse with ten subjects. No negative control was used. The study design was a double-blind, crossover trial with two five-day test periods with a two-day washout between test periods. The Student's *t*-test evaluated the differences between the groups, finding the sanguinaria oral rinse scores to be significantly higher. No crossover evaluation was reported.

Afseth and Rolla⁸ reported a pair of trials which evaluated glycolysis in the first trial and plaque in the second. The glycolysis trial tested three different concentrations of an aqueous solution of sanguinarine chloride with 3 subjects, with no observable differences. No active or negative controls were used. The design was a double-blind, four-day crossover trial. The plaque trial, with six subjects, compared sanguinaria oral rinse to 0.1% chlorhexidine and to a negative control. It was a five-day, experimental gingivitis crossover study with an unspecified washout period. Plaque growth was enhanced by chewing sucrose-containing gum for five minutes every second hour. The authors reported that the sanguinaria rinse provided "a small but statistically significant inhibitory effect compared to the placebo" but that "the effect was slight compared to that experienced with a 0.1% chlorhexidine." No tabular data were reported; no test of crossover effects was reported. Given that there were only six subjects in this second trial, the differences between sanguinaria and the placebo would most likely have been substantial in order for a statistically significant difference to be detected.

In 1987, Etemadzadeh and Ainamo⁹ reported two trials comparing two concentrations of sanguinaria to 0.2% chlorhexidine and to tap water. The first trial used 22 subjects; the second used ten. The first was a four-day crossover test with three days provided

for washout. The second trial was a two-week crossover testing two concentrations of sanguinaria extract with no negative control and an unspecified washout. No test for crossover effects was reported. No tabular means and standard deviations were provided for either study. The authors concluded that chlorhexidine was significantly better than sanguinaria or tap water.

Pretara-Spanedda et al.¹⁰ reported a two-day, double-blind crossover study with a five-day washout period with sixteen subjects. The test compared the effects of sanguinaria dentifrice, sanguinaria oral rinse, zinc citrate dentifrice, Crest tartar control dentifrice and deionized water. Results showed the zinc citrate dentifrice outperformed the other three groups in the inhibition of plaque, with the zinc citrate dentifrice, the sanguinaria oral rinse and Crest dentifrice approximately equal in their statistically significant reduction of plaque compared to deionized water. The sanguinaria toothpaste was not found to reduce plaque significantly in this design. The trial was a mixed design in that oral rinses were compared to slurries of dentifrices in an experimental gingivitis study. No test of carry-over effects was reported.

Gazi¹¹ conducted a multiple crossover, experimental gingivitis study of five days duration with a 9-day washout period. Use of a split mouth design for one of the groups resulted in a highly questionable set of design specifications which are not amenable to statistical evaluation. Sanguinaria, applied either by direct swabbing or rinsing, was compared to swabbing with water and to a 0.2% chlorhexidine rinse. Eight subjects participated in the trial; only the anterior teeth were evaluated, and no analysis of carry-over effects was reported. Results showed that chlorhexidine was the most effective agent in controlling plaque. Sanguinaria oral rinse, whether manually rinsed or applied by cotton pellet, was also significantly better than water, with the topical application the more effective of the two. Although results are favorable, this review is included in the questionable group of studies due to the peculiar design specifications.

In addition, there were two longer-duration experimental gingivitis studies

reported which included sanguinaria.

Siegrist *et al.*¹² reported a 21-day double-blind study with four parallel groups. Products tested were sanguinaria oral rinse, essential oils, chlorhexidine (0.12%), and an alcohol control of unspecified concentration. There were 9 subjects in each of the active groups and 4 in the control group. Chlorhexidine was significantly better than the other three groups. Sanguinaria performed comparably to essential oils and to the alcohol control, resulting in levels of gingivitis inhibition comparable to those achieved in previous studies,^{2,3} suggesting that the alcohol control was active (Table 2).

In 1988 Moran and Addy¹³ published a report of a study comparing sanguinaria oral rinse and 0.2% chlorhexidine. It was a single-blind, crossover study of 19 days duration for each test phase. The washout period was 9 days. There were 14 subjects in the trial, and a period effect was reported for gingivitis. Sanguinaria's actual efficacy was not determined since there was no negative control; however, sanguinaria was about 50% as effective as chlorhexidine.

One study of 21 days duration was reported which included toothbrushing with a sanguinaria toothpaste:

Mallatt and others¹⁴ tested sanguinaria toothpaste against a .05% sodium fluoride oral rinse and a tartar control dentifrice in a single-blind, three-group parallel study. Subjects either brushed with their assigned dentifrice under supervision using the Bass technique, or rinsed under supervision with the oral rinse. Brushing was not allowed in the oral rinse group. The two dentifrice groups had significantly less plaque and gingivitis than the rinse-only group, which is expected when comparing brushing groups to non-brushing groups. Adding oral hygiene instruction and product use supervision in the brushing groups

will further mask product effects, as subjects will do a more thorough job of tooth cleaning when they are being observed. In a supervised study, such as this, a significant Hawthorne effect is expected, thus making it difficult to detect differences between the two toothpaste formulations. Indeed, even in many unsupervised studies the Hawthorne effect can be observed for periods up to one month. This factor was not considered in the design of this study.

The information that can be gleaned from these trials is that short-duration trials using crossovers with minimal wash-out periods, lowered statistical power, and no evaluation of carry-over effects would most likely reduce the ability of the examiners to detect consistent, measurable anti-plaque or anti-gingivitis effects when testing antimicrobials. In some cases, the sanguinaria formulations were shown to be effective, but differences were not sufficient to achieve statistical significance. Such inconsistencies are often attributable to questionable design specifications. Further, the lack of a negative control often made it difficult to

Short-Term Testing

Significant differences obtained when:

- study duration is at least 14 days
- adequate washout between test phases (≥ two weeks)

Minimal or insignificant differences obtained when:

- multiple crossover
- variety of active products
- "home brew" formulations
- inadequate washout between test phases
- extremely small sample size
- no report of testing for carryover effects

position the effectiveness of sanguinaria-containing products between a placebo preparation and an active control (usually chlorhexidine) to establish its relative efficacy.

Trials Ranging from 30 to 90 Days

Sanguinaria oral rinse has been tested in two one-month studies:

Institutionalized para- and quadra-plegics used an experimental sanguinaria oral rinse in addition to their usual brushing routine.¹⁵ The products tested were an oral rinse containing 0.03% sanguinaria extract with no zinc chloride and a placebo rinse with neither sanguinaria nor zinc. Twenty-seven subjects completed the trial. At 30 days, there were statistically significant reductions in plaque and gingivitis with the sanguinaria product compared to placebo.

A second evaluation was reported by Gross in 1987.¹⁶ She tested sanguinaria oral rinse against essential oils and a negative control in a parallel design study. Both sanguinaria and essential oils were significantly better than the negative control for plaque at 28 days, but no differences were observed among the 3 groups for gingivitis. This study had 36 subjects with significant levels of disease at baseline. While the clinical measures were limited to the Ramford teeth, thereby limiting observations in each subject to six teeth, more importantly, the statistical test selected did not adjust for the considerable variability between groups at baseline.

Sanguinaria oral rinse was compared to chlorhexidine and a placebo rinse in a group of periodontal subjects prior to subgingival instrumentation and then as a part of initial therapy in a two-month trial:

Wennström and Lindhe,¹⁷ in a complex design, selected 21 subjects in need of periodontal treatment, scored them for plaque, gingivitis, and probing depth and then assigned them equally to either a placebo rinse, sanguinaria oral rinse, or a 0.2% chlorhexidine rinse. They used the assigned rinses for

TABLE 1.

Comparison of plaque and gingival index data from three short-term trials^{2,3,12}

	Wennström/Lindhe		Southard <i>et al.</i>		Siegrist <i>et al.</i> *		
	SaE Rinse	Placebo	SaE Rinse	Placebo	SaE Rinse	Essential Oils	Alcohol Control
Gingivitis	0.79	1.06	0.78	1.47	~0.75	~0.75	~0.60
Plaque	0.78	1.26	0.74	1.28	~1.40	~1.50	~1.10

* Numbers reported for this trial are estimates at 14 days based on the graphs shown in the publication.

two weeks and then were reevaluated. At this point, while chlorhexidine was significantly better than the sanguinaria oral rinse in controlling plaque, both active rinses were significantly better than the placebo rinse. No difference among any of the groups was noted for gingivitis at this point either. All subjects then received thorough mechanical debridement of two quadrants and the other quadrants were completed two weeks later. Subjects continued with their oral rinses during this period. Both the sanguinaria oral rinse and chlorhexidine significantly reduced the severity of plaque and gingivitis compared to the placebo; there was no significant difference between the two active products on plaque or gingivitis when used as an adjunct to scaling and root planing. However, only sanguinaria was shown to significantly reduce the incidence of pocket depths of 6 mm and greater compared to placebo.

Sanguinaria toothpaste formulations have also been tested in four-week and ten-week clinical trials:

Klewansky and Vernier¹⁸ tested a toothpaste containing 0.03% sanguinaria and 2.7% zinc chloride against a placebo toothpaste with neither sanguinaria nor zinc. Thirty periodontal subjects completed the trial. The sanguinaria toothpaste was statistically and clinically better than the control products at 30 days for plaque (Figure 1), papillary bleeding, and sulcular bleeding.

Schonfeld et al.¹⁹ tested sanguinaria toothpaste in a 30-day, open-label study design where half the subjects used sanguinaria and the other half used whatever toothpaste they wished. There were six subjects in the first

group and eight in the second. The subjects, who were dental students, were instructed to brush and floss prior to the start of the study and maintained this routine for the 30-day period. Subjects were characterized by high levels of health at baseline using the Greene and Vermillion debris index. Sanguinaria produced a 46% reduction in plaque compared to the "any other toothpaste" group which produced a 36% reduction. However, statistical power was insufficient to reveal a significant result using the Mann-Whitney ranks test. To further confirm the results, it appears that the site was the basis of statistical analysis.

Klewansky and Roth,²⁰ in a four-group study, tested the marketed sanguinaria toothpaste (then containing 0.03% sanguinaria and 2.0% zinc chloride) against a 2.0% zinc chloride toothpaste, a sanguinaria toothpaste with no zinc, and against a placebo with neither sanguinaria nor zinc. Fifty-three subjects completed the ten week parallel design trial. In analyses performed subsequent to publication, sanguinaria-containing products produced significantly greater inhibition of plaque and reductions in papillary and sulcular bleeding compared to placebo. In this study, the sanguinaria formulation without zinc performed best.

Long-Term Trials

Four of the eight 6-month trials conducted on sanguinaria products will be discussed here. The remaining four combined-regimen studies will be presented in another paper.

One positive six-month clinical trial is reported where only the toothpaste was tested. Lobene et al.²¹ tested the sanguinaria toothpaste against a placebo preparation without sanguinaria or zinc chloride with 99 subjects completing the trial. The sanguinaria toothpaste inhibited gingivitis significantly better than did the placebo toothpaste at 6 months. Differences approaching statistical significance were observed for plaque at 3 months for all surfaces and at 6 months for lingual surfaces. The scores for plaque and gingivitis rose in parallel for both groups from 3 months to 6 months, apparently the subject of much discussion in the research community. This has recently been

attributed primarily to a fall-off in subject compliance in both groups over the second three months of the trial during which they were not scored or given reinforcement in their product usage.

Mauriello and Bader²² performed a clinical trial of six months duration with one-hundred fifteen subjects. Subjects used either a sanguinaria toothpaste or a placebo toothpaste containing 2.7% zinc chloride with no sanguinaria. No significant differences were detected for either plaque or gingival indices. Design features that may have affected the outcome of the trial include: 1) five different examiners (four reported by the authors) were used to score the subjects, 2) each subject did not see the same examiner throughout the trial, 3) no inter-rater reliability data were gathered prior to the start of the trial, and 4) plaque scoring using red discolorant solution preceded the evaluation of the gingival tissues.

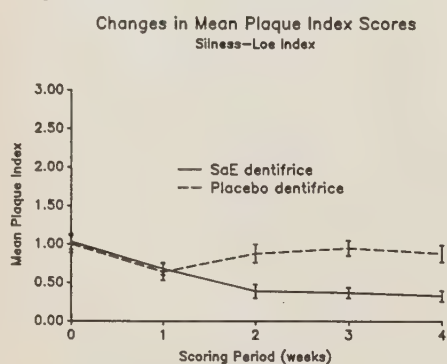
Palcanis et al.²³ recently published a six-month trial in which 94 subjects were assigned to a sanguinaria or placebo dentifrice. The authors concluded that there were no significant differences between the two products. Inspection of the data indicates that baseline plaque and gingival index scores were exceptionally low. Therefore, it is questionable whether an over-the-counter product could further reduce the scores.

Grossman et al.²⁴ published a six-month trial comparing sanguinaria oral rinse, essential oils, 0.12% chlorhexidine and an unspecified placebo rinse. They reported that sanguinaria significantly reduced plaque slightly, but had no effect on gingivitis. Gingival and bleeding index scores at baseline were very low, and reductions were minimal for all groups (Figure 2). Statistical significance for gingival and bleeding index scores appear to be more a function of sample size (481) than of the actual dimension of change. Data from this trial were used to secure the American Dental Association Seal for Peridex Oral Rinse.

Conclusions

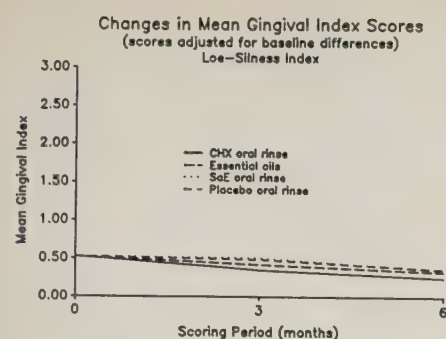
The results obtained in well-designed, short-term studies demonstrate the effectiveness of sanguinaria toothpaste and oral rinse when used individually.

Figure 1



Changes in plaque index scores for subjects using sanguinaria or placebo toothpaste in a four week study¹⁸.

Figure 2



Changes in gingival index scores during six months use of chlorhexidine, essential oils, sanguinaria, or a placebo oral rinse²⁴.

Three additional six month clinical trials will be reported later here which test the combined use of sanguinaria toothpaste and oral rinse. The results of these trials include significant differences for plaque, gingivitis and microbiological effects. They also confirm the safety of sanguinaria for inclusion in toothpastes and oral rinses. However, the clinical results obtained from three six-month studies which tested the products individually do not reveal the same separations from placebo.

While the results of these trials are open to interpretation, there appears to be an instructive pattern. These indications have been applied in subsequent research of sanguinaria products.

Summarized:

- use parallel groups
- use sufficient numbers of subjects to reduce the possibility of a Type II statistical error
- ensure proper intra- and inter-rater reliability prior to the start of the trial
- measure all the teeth rather than relying on a subset of teeth in order to produce sufficient observations in each subject to ensure precision
- either score plaque after gingivitis or use no disclosing solution
- ensure that the duration of the trial is at least 14 days (experimental gingivitis designs) or 30 days (where brushing is allowed)
- test the products on the population for whom they are intended, i.e., subjects with moderate to high levels of plaque and gingivitis
- when possible, assign subjects in randomized blocks (e.g., based on disease severity), and
- use analysis of covariance when appropriate to minimize experimental error due to variability among subjects at baseline. ▼

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TABLE 1.

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results		
Southard <i>et al.</i> , <i>J Am Dent Assoc</i> 108 :338-341, 1984	• .03% SaE, .2% ZnCl oral rinse • .045% SaE oral rinse • Placebo oral rinse	Double-blind, parallel groups • 7-day test period • safety study • exaggerated use (5x/day) • 18 subjects	Quigley-Hein plaque index	Means ($\pm$ s.e.)	Baseline	Day 7
				.03% SaE	2.99 $\pm$.48	2.38 $\pm$.29
				.045% SaE	2.68 $\pm$.35	2.16 $\pm$.18
				Placebo	2.44 $\pm$.36	2.96 $\pm$.30
				Sanguinaria produced significantly lower plaque index scores than placebo ($p < .05$)		
Wennstrom & Lindhe, <i>J Clin Periodontol</i> 12 :867-872, 1985	• .03% SaE, .2% ZnCl oral rinse • Placebo oral rinse	Double-blind, experimental gingivitis, crossover • 14-day test phase • 3-month washout • 14 subjects Subjects brought to optimal health prior to test period	Silness-Loe plaque index Loe-Silness gingival index	Means($\pm$ s.e.)	Baseline	14 days
				Plaque Index		
				Sanguinaria	0.00 $\pm$.00	0.78 $\pm$.09
				Placebo	0.00 $\pm$.00	1.26 $\pm$.09
						$p < .001$
				Gingival Index		
				Sanguinaria	0.31 $\pm$.02	0.79 $\pm$.04
				Placebo	0.32 $\pm$.02	1.06 $\pm$.04
						$p < .001$
Southard <i>et al.</i> , <i>J Clin Periodontol</i> 14 :315-319, 1987	• .03% SaE, .2% ZnCl oral rinse • Placebo oral rinse	Double-blind, experimental gingivitis, crossover • 14-day test period • 4-6 week washout • 13 subjects Subjects brought to optimal health prior to test period	Loe-Silness plaque index Silness-Loe gingival index	Means ($\pm$ s.e.)	Baseline	14 days
				Plaque Index		
				Sanguinaria	0.00 $\pm$.00	0.74 $\pm$.08
				Placebo	0.00 $\pm$.00	1.28 $\pm$.11
						$p < .01$
				Gingival Index		
				Sanguinaria	0.17 $\pm$.05	0.78 $\pm$.11
				Placebo	0.14 $\pm$.02	1.47 $\pm$.14
						$p < .01$
Parsons <i>et al.</i> , <i>J Clin Periodontol</i> 14 :381-385, 1987	• Water irrigation • .00225% SaE irrigation • .03% SaE oral rinse	Single-blind, experimental gingivitis, parallel groups • 2-week test period • 44 subjects	Quigley-Hein plaque index Loe gingival index	Means ($\pm$ s.e.)	Baseline	2 Weeks
				Plaque Index		
				Water irrigation	2.456 $\pm$.12	3.721 $\pm$.14
				SaE irrigation	2.358 $\pm$.17	2.929 $\pm$.08
				SaE rinsing	2.405 $\pm$.16	2.831 $\pm$.09
				Gingival Index		
				Water irrigation	1.880 $\pm$.04	0.502 $\pm$.03
				SaE irrigation	1.878 $\pm$.06	0.591 $\pm$.12
				SaE rinsing	1.885 $\pm$.06	1.323 $\pm$.11
				Irrigation, regardless of solution, significantly reduced gingivitis compared to rinsing ($p < .01$)		
				Sanguinaria, whether delivered via rinsing or irrigation, significantly inhibited plaque growth compared to water irrigation ($p < .01$)		
Southard <i>et al.</i> , <i>J Clin Periodontol</i> 14 :377-380, 1987	• .03% SaE, .2% ZnCl oral rinse • .00225% SaE irrigation • .009% SaE irrigation • Placebo oral rinse	Single-blind, experimental gingivitis, crossover • 2-week test period • 4-6 week washout • 13 subjects Subjects brought to optimal health prior to test period	Silness-Loe plaque index Loe-Silness gingival index	Means ($\pm$ s.e.)	Baseline	2 Weeks
				Plaque Index		
				SaE rinse	0.00 $\pm$.00	0.73 $\pm$.08
				.00225% SaE	0.00 $\pm$.00	0.84 $\pm$.10
				.009% SaE	0.00 $\pm$.00	0.55 $\pm$.07
				Placebo rinse	0.00 $\pm$.00	1.28 $\pm$.11

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results
				Gingival Index SaE rinse 0.17±.05 0.82±.11 .00225% SaE 0.04±.01 0.65±.12 .009% SaE 0.04±.01 0.37±.12 Placebo 0.14±.02 1.48±.14 Use of SaE, whether used as a rinse or in an irrigator, significantly inhibited plaque and gingivitis compared to placebo (p<.05).
Abbas <i>et al.</i> , <i>Scand J Dent Res</i> 93 :494-497, 1985	.03% SaE, .2% ZnCl oral rinse .2% CHX oral rinse	Double-blind crossover 5-day test period 2-day washout - ten subjects	Silness-Loe plaque index	Means (±s.e.) after 5-day period Sanguinaria 0.87±.09 Chlorhexidine 0.24±.05 p<.001 - Test period too short - No placebo tested - No report of crossover testing - Washout period insufficient
Afseth & Rolla, <i>Caries Res</i> 21 :285-288, 1987 Study #1	Aqueous solutions of: .01% SaCl .05% SaCl .1% SaCl	Double-blind crossover 4-day test period - unspecified washout 3 subjects	Plaque pH	- No change in pH values for .01% SaCl solution .05% SaCl inhibited glycolysis at 10 minutes
Afseth & Rolla <i>Caries Res</i> 21 :285-288, 1987 Study #2	.1% SaCl, .2% ZnCl oral rinse .1% CHX oral rinse - Placebo oral rinse	Double-blind, experimental gingivitis, crossover 5-day test period - unspecified washout period 6 subjects	Silness-Loe plaque index	Tabular data not reported. - SaCl exhibited "small but statistically significant" reduction compared to placebo; "effect was slight compared to that experienced with .1% chlorhexidine". - Crossover effects not reported - Sample size insufficient - Unspecified washout - Formulations not representative of marketed product
Etemedzadeh & Ainamo, <i>J Clin Periodontol</i> 14 :187-190, 1987	Study 1 .03% SaE, .2% ZnCl oral rinse .2% CHX oral rinse - tap water Study 2 .03% SaE, .2% ZnCl oral rinse .1% SaE oral rinse	Study 1 Double-blind, experimental gingivitis, crossover 4-day study period 3-day washout period 22 subjects Study 2 Double-blind experimental gingivitis, crossover 2-week study period - unspecified washout 10 subjects	Silness-Loe plaque index Bay-Ainamo plaque area Wet plaque weight	Study 1 - Tabular data not reported - CHX significantly better than SaE and water for Silness-Loe PI and plaque weight (p<.05); CHX significantly lower than water for plaque area - no crossover effects reported Study 2 - No significant differences between the two concentrations of SaE

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results															
Pretara-Spanedda <i>et al.</i> , <i>J Dent Res</i> 66 :Abs. 1211, 1987	• Tartar control toothpaste • .075% SaE, ZnCl (unspecified) toothpaste • Zinc citrate toothpaste • .03% SaE, .2% ZnCl oral rinse • Deionized water	• Double-blind, crossover • 2-day test period • 5-day washout period • 14 subjects	Unspecified plaque index	Percent inhibition compared to DI water <table><tr><td>Zinc citrate toothpaste</td><td>29% (p=.001)</td></tr><tr><td>SaE/ZnCl oral rinse</td><td>17% (p=.01)</td></tr><tr><td>Tartar control toothpaste</td><td>15% (p=.01)</td></tr><tr><td>SaE/ZnCl toothpaste</td><td>7%</td></tr></table> • All groups significantly different from deionized water except SaE/ZnCl toothpaste • no crossover effects reported • 2-day test period insufficient • 5-day washout insufficient • mixed design compared oral rinse to toothpaste	Zinc citrate toothpaste	29% (p=.001)	SaE/ZnCl oral rinse	17% (p=.01)	Tartar control toothpaste	15% (p=.01)	SaE/ZnCl toothpaste	7%							
Zinc citrate toothpaste	29% (p=.001)																		
SaE/ZnCl oral rinse	17% (p=.01)																		
Tartar control toothpaste	15% (p=.01)																		
SaE/ZnCl toothpaste	7%																		
Gazi, <i>J Clin Periodontol</i> 15 :106-109, 1988	• .03% SaE, .2% ZnCl oral rinse • water • .2% CHX oral rinse	Single-blind crossover • 5-day test period • 9-day washout period • 8 subjects Treatments • Split-mouth • Topically applied SaE oral rinse • Topically applied water • Manual rinsing • SaE oral rinse • CHX oral rinse	Graphic digitization of plaque surface/tooth area	Means ($\pm$s.e.) post-test <table><tr><td>SaE manual rinsing</td><td>0.271$\pm$.06</td></tr><tr><td>SaE topically applied</td><td>0.206$\pm$.05</td></tr><tr><td>Water topically applied</td><td>0.345$\pm$.07</td></tr><tr><td>CHX manual rinsing</td><td>0.038$\pm$.01</td></tr></table> • All groups were significantly better than topically applied water (p<.001) • Topically applied SaE produced significantly lower scores than SaE manual rinsing (p<.05) • Study not amenable to appropriate statistical analysis due to multiple crossover and split-mouth design; no report of crossover effects • Small sample size • No separation of plaque reduction on proximal surfaces	SaE manual rinsing	0.271 $\pm$.06	SaE topically applied	0.206 $\pm$.05	Water topically applied	0.345 $\pm$.07	CHX manual rinsing	0.038 $\pm$.01							
SaE manual rinsing	0.271 $\pm$.06																		
SaE topically applied	0.206 $\pm$.05																		
Water topically applied	0.345 $\pm$.07																		
CHX manual rinsing	0.038 $\pm$.01																		
Siegrist <i>et al.</i> <i>J Periodont Res Supp</i> 16 :60-73, 1986	• Essential oils oral rinse • .03% SaE, .2% ZnCl oral rinse • .12% CHX oral rinse • Unspecified alcohol control	Double-blind, experimental gingivitis, parallel study • 3-weeks duration • supervised product use • 31 subjects (9 each test products, 4 placebo)	Silness-Loe plaque index Loe-Silness gingival index	Group means at day 21: <table><tr><td></td><td>Plaque</td><td>Gingivitis</td></tr><tr><td>Essential oils</td><td>~1.43</td><td>1.16</td></tr><tr><td>.03% SaE</td><td>~1.50</td><td>1.26</td></tr><tr><td>.12% CHX</td><td>0.51</td><td>0.16</td></tr><tr><td>Alcohol control</td><td>~1.59</td><td>1.36</td></tr></table> • CHX oral rinse group exhibited significantly less plaque and gingivitis than any other group (p<.05) • Alcohol level of placebo undefined; appears from results that the alcohol control had some level of activity • Small number of subjects per group, particularly in alcohol control group		Plaque	Gingivitis	Essential oils	~1.43	1.16	.03% SaE	~1.50	1.26	.12% CHX	0.51	0.16	Alcohol control	~1.59	1.36
	Plaque	Gingivitis																	
Essential oils	~1.43	1.16																	
.03% SaE	~1.50	1.26																	
.12% CHX	0.51	0.16																	
Alcohol control	~1.59	1.36																	
Moran & Addy, <i>J Clin Periodontol</i> 15 :612-616, 1988	• .01% SaCl, .2% ZnCl oral rinse • .2% CHX oral rinse	Single-blind crossover • 19-day study period • 9-day washout • 14 subjects	Greene-Vermillion debris index Loe-Silness gingival index	Means ($\pm$s.e.) <table><tr><td>Baseline</td><td>19 days</td></tr><tr><td>Plaque (G-V)</td><td></td></tr><tr><td>SaCl rinse</td><td>0.00$\pm$.00</td></tr><tr><td>CHX rinse</td><td>0.00$\pm$.00</td></tr></table> 2.68$\pm$.10 1.22$\pm$.06	Baseline	19 days	Plaque (G-V)		SaCl rinse	0.00 $\pm$.00	CHX rinse	0.00 $\pm$.00							
Baseline	19 days																		
Plaque (G-V)																			
SaCl rinse	0.00 $\pm$.00																		
CHX rinse	0.00 $\pm$.00																		

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results		
				Gingival Index		
			Planimetric plaque evaluation	SaE rinse	0.14±.03	0.79±.09
				CHX rinse	0.14±.04	0.31±.06
				• CHX significantly lower than SaE ($p<.001$) • A period effect was reported • No placebo tested; therefore, it is not possible to position effectiveness of SaCl rinse between positive and negative controls • Washout period insufficient • SaCl results for the gingival index match those found in trials reported by Lindhe and Southard		
Mallatt <i>et al.</i> , <i>J Periodontol</i> 60 :91-95, 1989	• .05% NaF oral rinse • .075% SaE, .05% ZnCl, .8% NaMFP toothpaste • Crest tartar control toothpaste	Single-blind, parallel study • 3-week study period • 55 subjects • Supervised product use • Subjects in .05% NaF rinsing group rinsed twice daily - no other oral hygiene allowed • Subjects in dentifrice groups brushed with their assigned toothpaste according to Bass technique	Silness-Loe plaque index Loe-Silness gingival index	Means Scores Plaque SaE toothpaste Crest TC NaF oral rinse	Baseline 0.12 0.10 0.13	21 days (adjusted) 0.28 0.29 0.98
				Gingivitis		
				SaE toothpaste	0.17	0.23
				Crest TC	0.17	0.23
				NaF oral rinse	0.17	0.66
				• Brushing with Crest and SaE reduced plaque and gingivitis significantly better than rinsing with NaF • Mixed design compared brushing groups to "rinse only" group • Supervised brushing with Bass instruction will mask efficacy of any product tested in this design • Insufficient study duration even for unsupervised design • Health of subjects at baseline does not leave room for improvement		
Nuckols <i>et al.</i> , <i>J Dent Res</i> 66 :Abs. #369, 1987	• .03% SaE oral rinse (no ZnCl) • Placebo (no ZnCl)	Double-blind, parallel groups • 1-month test period • Para- and quadraplegics • 27 subjects	Silness-Loe plaque index Loe-Silness gingival index	Mean Scores Plaque SaE rinse Placebo	Baseline 2.08 2.15	1 Month 1.24 1.64
				Gingivitis		
				SaE rinse	1.88	1.47
				Placebo	1.86	1.72
				• SaE oral rinse significantly better than placebo for both plaque and gingivitis ($p<.05$)		

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

<i>Citation</i>	<i>Formulations</i>	<i>Design</i>	<i>Indices</i>	<i>Results</i>		
Gross <i>et al.</i> , <i>Dent Hyg</i> Feb. 1987, pp 62-66	• .03% SaE, .2% ZnCl oral rinse • Essential oils oral rinse • Placebo (10% alcohol control)	Double-blind, parallel groups • 28-day test period • 36 subjects	Loe gingival index Quigley-Hein plaque index	Means ($\pm$ s.e.) Plaque SaE rinse Essential oils Placebo Gingival SaE rinse Essential oils Placebo	Baseline 2.33 $\pm$.09 2.51 $\pm$.16 2.29 $\pm$.15 1.37 $\pm$.04 1.50 $\pm$.06 1.41 $\pm$.04	Day 28 1.89 $\pm$.11 2.04 $\pm$.12 2.20 $\pm$.14 1.29 $\pm$.03 1.38 $\pm$.05 1.30 $\pm$.04
				• PI scores at day 28 significantly lower for SaE and essential oils compared to baseline ($p < .01$); no significant between-group differences • No significant between-group differences for gingivitis • Limited number of teeth scored (Ramfjord) will limit precision of index scores • Statistical analysis does not account for baseline differences		
Wennström & Lindhe, <i>J Clin Periodontol</i> 13:86-93, 1986	• .03% SaE, .2% ZnCl oral rinse • .2% CHX oral rinse • Placebo oral rinse	Double-blind, parallel groups • 8-week test period • scale 2 quadrants at 2 weeks • scale remaining 2 quadrants at 4 weeks • 21 subjects	Silness-Loe plaque index Loe-Silness gingival index Probing pocket depth	• CHX significantly reduced incidence of plaque scores of 2 & 3 compared to placebo and to SaE ($p < .05$) • SaE significantly reduced the incidence of probing pocket depths greater than 6 mm ($p < .05$) • No significant difference between SaE and CHX for gingival index or probing pocket depth		
Klewansky & Vernier, <i>Comp Cont Ed Dent Suppl</i> 5., pp 94-97, 1984	• .03% SaE, 2.7% ZnCl toothpaste • Placebo toothpaste	Double-blind, parallel groups • 4-week test period • 30 subjects	Silness-Loe plaque index Muhlemann-Son sulcular bleeding index Muhlemann papillary bleeding index	Means ($\pm$ s.e.) Plaque SaE toothpaste Placebo Sulcular bleeding SaE toothpaste Placebo Papillary bleeding SaE toothpaste Placebo	Baseline 1.03 $\pm$.10 1.00 $\pm$.11 0.76 $\pm$.18 0.54 $\pm$.13 2.69 $\pm$.10 2.41 $\pm$.10	4 Weeks 0.33 $\pm$.07 0.88 $\pm$.11 0.08 $\pm$.05 0.48 $\pm$.11 0.83 $\pm$.15 2.37 $\pm$.24
				• Original publication reported significance of changes from baseline; SaE significantly reduced all indices compared to baseline values • Subsequent analyses indicate that SaE significantly reduced plaque, sulcular bleeding and papillary bleeding compared to placebo ($p < .0001$)		

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results																																																
Schonfeld <i>et al.</i> , <i>J Periodont Res</i> 21 :298-303, 1986	.075% SaE toothpaste “any other” toothpaste	Open label, parallel study - Oral hygiene instructions included once daily flossing 14 subjects (6 in SaE group, 8 in “any other” group)	Greene-Vermillion debris index Darkfield microscopy	- No significant differences between groups for plaque - site-based analysis - no adjustment for baseline differences - Oral hygiene instruction and daily flossing will mask product effects - Health of subjects at baseline does not allow for improvement - Lack of homogeneity in control group - any other toothpaste allowed - No significant difference between groups for darkfield microscopy																																																
Klewansky & Roth, <i>Comp Cont Ed Dent</i> , Suppl. 7, 218-220, 1986	.03% SaE, 2.0% ZnCl toothpaste .03% SaE, no ZnCl toothpaste 2.0% ZnCl toothpaste - Placebo toothpaste	Double-blind, parallel groups, 2x2 design 10-week test period 53 subjects Subjects received a thorough prophylaxis after baseline scoring	Silness-Loe plaque index Muhlemann-Son sulcular bleeding index Muhlemann papillary	<table><tr><td>Means (±s.e.)</td><td>Baseline</td><td>10 weeks</td></tr><tr><td>Plaque</td><td></td><td></td></tr><tr><td>SaE/ZnCl</td><td>2.244±.12</td><td>0.856±.15</td></tr><tr><td>SaE only</td><td>2.389±.15</td><td>0.653±.10</td></tr><tr><td>ZnCl only</td><td>2.385±.18</td><td>0.949±.16</td></tr><tr><td>Placebo</td><td>2.379±.18</td><td>1.151±.23</td></tr><tr><td>bleeding index</td><td>Sulcular bleeding</td><td></td></tr><tr><td>SaE/ZnCl</td><td>2.845±.19</td><td>1.389±.19</td></tr><tr><td>SaE only</td><td>2.972±.26</td><td>1.056±.25</td></tr><tr><td>ZnCl only</td><td>2.615±.24</td><td>1.038±.20</td></tr><tr><td>Placebo</td><td>2.985±.20</td><td>1.500±.26</td></tr><tr><td>Papillary bleeding</td><td></td><td></td></tr><tr><td>SaE/ZnCl</td><td>3.311±.15</td><td>1.856±.21</td></tr><tr><td>SaE only</td><td>3.222±.19</td><td>1.445±.10</td></tr><tr><td>ZnCl only</td><td>3.179±.18</td><td>1.679±.20</td></tr><tr><td>Placebo</td><td>3.015±.18</td><td>2.288±.27</td></tr></table> - Initial analyses ignored the 2x2 design, but reported significant differences between SaE and placebo for bleeding indices. - Analyses performed subsequent to publication illustrated the effectiveness of SaE on plaque and bleeding indices (p<.01).	Means (±s.e.)	Baseline	10 weeks	Plaque			SaE/ZnCl	2.244±.12	0.856±.15	SaE only	2.389±.15	0.653±.10	ZnCl only	2.385±.18	0.949±.16	Placebo	2.379±.18	1.151±.23	bleeding index	Sulcular bleeding		SaE/ZnCl	2.845±.19	1.389±.19	SaE only	2.972±.26	1.056±.25	ZnCl only	2.615±.24	1.038±.20	Placebo	2.985±.20	1.500±.26	Papillary bleeding			SaE/ZnCl	3.311±.15	1.856±.21	SaE only	3.222±.19	1.445±.10	ZnCl only	3.179±.18	1.679±.20	Placebo	3.015±.18	2.288±.27
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Lobene <i>et al.</i> , <i>Comp Cont Ed Dent</i> Suppl. 7, pp 185-188, 1986	.075% SaE, 2.0% ZnCl toothpaste - Placebo toothpaste	Double-blind, parallel groups 6-month test period 99 subjects	Silness-Loe plaque index Loe-Silness gingival index	<table><tr><td>Means (±s.e.)</td><td>Baseline</td><td>6 Months</td></tr><tr><td>Plaque</td><td></td><td></td></tr><tr><td>SaE</td><td>0.71±.04</td><td>0.86±.07</td></tr><tr><td>Placebo</td><td>0.71±.03</td><td>0.98±.13</td></tr><tr><td>Gingival</td><td></td><td></td></tr><tr><td>SaE</td><td>0.63±.04</td><td>0.94±.08</td></tr><tr><td>Placebo</td><td>0.69±.03</td><td>1.18±.07</td></tr></table> - Initial analyses reported a significant difference between SaE and placebo for gingivitis (p<.05), and differences for plaque which approached significance (p<.10). - Repeated measures analyses conducted subsequent to publication reported significant differences between SaE and placebo for both plaque and gingivitis (p<.02).	Means (±s.e.)	Baseline	6 Months	Plaque			SaE	0.71±.04	0.86±.07	Placebo	0.71±.03	0.98±.13	Gingival			SaE	0.63±.04	0.94±.08	Placebo	0.69±.03	1.18±.07																											
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TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products.

Citation	Formulations	Design	Indices	Results		
Mauriello & Bader, <i>J Periodontol</i> 59 :238-243, 1988	• .075% SaE, 2.7% ZnCl toothpaste • Placebo toothpaste with 2.7% ZnCl	Double-blind, parallel groups • 115 subjects entered	Silness-Loe plaque index	Means (±s.e.)	Baseline	6 Months
			• disclosing solution used • scored prior to gingival index scoring	SaE	1.22± .04	1.09± .03
				Placebo	1.21± .04	1.05± .03
				Gingival		
			SaE	0.76± .05	0.91± .04	
			Placebo	0.78± .05	0.96± .03	
			Loe-Silness gingival index	• No significant differences reported for either index • No differences between groups for microbiological testing • Multiple examiners used • Examiners did not see the same patients at all time points • No inter-rater reliability established prior to study initiation • Plaque scoring involved use of erythrosine disclosing solution, and took place prior to gingival index scoring		
			Microbiological testing			
Palcanis <i>et al.</i> , <i>Gen Dent</i> Jan-Feb., pp 17-19, 1990	• .075% SaE, .05% ZnCl, .8% NaMFP toothpaste • .8% NaMFP toothpaste	Double-blind, parallel groups • 94 subjects	Silness-Loe plaque index	Means (±s.e.)	Baseline	6 months
				SaE	0.80± .04	0.61± .04
				Placebo	0.78± .04	0.65± .05
				Gingival		
			SaE	0.76± .04	0.75± .04	
			Placebo	0.76± .03	0.82± .04	
				• No significant difference between SaE and placebo • Health of subjects at baseline leaves little room for improvement		
Grossman <i>et al.</i> , <i>J Periodontol</i> 60 :435-440, 1989	• .12% CHX oral rinse • Essential oils oral rinse • .03% SaE, .2% ZnCl oral rinse • Placebo (unspecified)	Double-blind, parallel study • 6-month study period • 481 subjects	Quigley-Hein plaque index	Mean Scores	Baseline	6 Months
				Plaque		
				CHX	1.41	0.76
				Essential oils	1.48	1.13
				SaE	1.49	1.31
			Placebo	1.40	1.49	
			Loe-Silness gingival index			
			Bleeding upon probing	Gingival		
				CHX	0.53	0.25
				Essential oils	0.52	0.33
				SaE	0.55	0.35
				Placebo	0.50	0.37
				Bleeding upon probing		
				CHX	0.13	0.05
				Essential oils	0.12	0.17
			SaE	0.13	0.07	
			Placebo	0.11	0.08	
• CHX reduced all indices significantly better than all other treatments (p<.05); SaE and essential oils reduce plaque significantly better than placebo (p<.05) • Health of subjects at baseline leaves no room for improvement • Clinical significance of the differences is questionable						

Sanguinaria Toothpaste And Oral Rinse Regimen Clinical Efficacy In Short- And Long-Term Trials

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ABSTRACT

Short- and long-term testing of sanguinaria toothpaste and oral rinse used individually have yielded both positive and negative results. This review evaluates the results of a number of clinical trials testing the regimen use of sanguinaria products for periods ranging from 14 days to six months. Review of these trials establishes the clinical efficacy of the two products in combination. The regimen approach produces consistently positive reductions in plaque, gingival inflammation and bleeding parameters for up to six months with no adverse hard tissue effects and only one reversible adverse soft tissue effect observed among the 260 subjects tested. In addition, no adverse microbiological shifts in the normal oral flora were observed.

Introduction

While the short- and long-term trials of the individual sanguinaria toothpaste and oral rinse products have mixed results,¹⁻²³ trials evaluating the regimen use of the two products have been consistently positive. It appears that the sequential application of the dentifrice with a brush immediately followed by a rinse of 30 to 60 seconds provides a sustained anti-plaque and anti-gingivitis effect which can be detected at approximately 14 days and which is still evident after 6 months of use. Furthermore, there are no reports, save one, that this regimen approach produces adverse soft or hard tissue effects or that it contributes to adverse microbiological shifts in the normal flora.



Mladen M. Kuftinec, DMD, ScD

This paper will review the clinical trials that tested the regimen application of sanguinaria products, including: 1) one 14-day trial, 2) one 28-day trial, 3) one 60-day trial, 4) one 90-day trial, and 5) three 6-month trials.

Short-Term Trials

Greenfield and Cuchel²⁴ tested sanguinaria toothpaste and oral rinse versus Zendium toothpaste. Zendium was chosen for this head-to-head trial since it was a commercially available dentifrice purported to help control plaque by boosting the oral cavity's natural ability to produce small quantities of hydrogen peroxide to control proliferating bacteria. No negative control was used. Sixty subjects were randomly assigned to the two groups and used the products three times daily for two weeks. Following a two-week washout period, the subjects were then crossed over to the other regimen for an additional two-week test period. Plaque was scored using the Silness & Loe plaque index. No gingivitis measurements were taken. Student's t and Chi-

square analyses showed a statistically significant plaque reduction (48%) for the sanguinaria regimen compared to Zendium; no analysis of carry-over effect was conducted in the original analysis. The sanguinaria regimen produced detectable reductions in plaque at two weeks when compared to an agent which also may have had an antimicrobial effect.

The 28-day study²⁵ evaluated the sanguinaria regimen of toothpaste and oral rinse versus placebo preparations without sanguinaria extract. Twenty-four subjects (9 male, 14 female) between the ages of 23 and 61 were randomly assigned to the two groups who used the products for 28 days. The plaque index of Silness and Loe and the gingival index of Loe and Silness were evaluated at days 0 and 28. After a two-week wash-out period, the subjects were crossed-over to the other regimen and used their newly assigned products twice daily for an additional 28 days. The initial chi-square analyses focused on numbers of subjects improving versus those getting worse in each of the two groups, and concluded that differences between the groups approached statistical significance. A subsequent analysis using a more powerful test (analysis of covariance) reveals statistically significant differences between the active and placebo groups for both plaque and gingivitis with the lower scores observed in the sanguinaria regimen group. There were no carry-over effects.

Patel²⁶ evaluated 1) a placebo toothpaste followed by 0.03% sanguinaria oral rinse, 2) the regimen of sanguinaria toothpaste and oral rinse, 3) a placebo toothpaste and oral rinse, and 4) a placebo toothpaste followed by 0.12% chlorhexidine rinse. He used orthodontic subjects with considerable

levels of plaque and bleeding. Orthodontic patients are ideal candidates for demonstrating the efficacy of antimicrobials since they exhibit simple, reversible gingivitis without loss of attachment and typically have high levels of plaque due to the interference of the orthodontic appliances. The sixty-five randomly assigned subjects used one of the four products for eight weeks and were evaluated for plaque and gingival bleeding at baseline and at 4 and 8 weeks. Calculus was evaluated at baseline and 8 weeks. The sanguinaria regimen was significantly better than the placebo at 4 and 8 weeks for both plaque and bleeding, and it was significantly better than the sanguinaria oral rinse for both indices at eight weeks. Chlorhexidine produced plaque index scores which were significantly lower than placebo at 4 and 8 weeks, and bleeding index scores which were significantly lower than placebo at 8 weeks. There was no significant difference between the sanguinaria oral rinse and chlorhexidine for either plaque or bleeding in this trial. There was no increase in calculus incidence for patients using the sanguinaria products, while the chlorhexidine group experienced a 30% increase in calculus incidence.

A second study with orthodontic patients evaluated the effectiveness of the sanguinaria regimen²⁷. In order to reduce the Hawthorne effect, all 44 subjects used the placebo preparations for a period of three weeks. Following this pre-test period, they were randomly assigned to the sanguinaria regimen or to the placebo group for the remaining nine weeks of the trial. Subjects using the sanguinaria regimen experienced significantly greater reductions in plaque and gingivitis than did those using the placebo preparations.

Long-Term Testing

The positive results of these two shorter-term orthodontic trials with sanguinaria were confirmed, and positive effects were shown to persist for six months in the study published by Hannah, Johnson, and Kuftinec²⁸. Twenty-four orthodontic subjects were randomly assigned to the sanguinaria toothpaste and oral rinse or to placebo preparations without sanguinaria. Statistically and clinically significant differences for plaque, gingivitis, and sulcular bleeding were observed at 2

months and throughout the remainder of the trial. Thus, it seems apparent that sanguinaria toothpaste and oral rinse are effective products for the control of simple gingivitis and plaque in an orthodontic population and clearly can enhance the effectiveness of the patient's efforts to control those problems with the mechanical action of the toothbrush.

The sanguinaria regimen of toothpaste and oral rinse has also been tested for the control of adult chronic gingivitis. Harper and colleagues²⁹ reported a six month trial with 53 subjects who exhibited substantial levels of plaque and gingivitis but no evidence of periodontitis. After baseline scoring, two contralateral, randomly assigned quadrants in each person's dentition were polished to remove plaque. Subjects were randomly assigned to either the active regimen of sanguinaria dentifrice and oral rinse or to the placebo preparations. They were instructed to use the products twice daily, brushing their teeth as they normally would, but using their assigned toothpaste, followed by a 60 second rinse with 15 mls of their assigned oral rinse. Subjects recorded product usage in a diary and returned unused portions of the product at each appointment. Unused product was weighed to assist in compliance monitoring.

Noninvasive plaque and gingival indices were used to score the subjects at 0, 2, 6, 8, 14, 20, and 28 weeks. Bleeding upon probing was scored on six surfaces of all teeth present at baseline and at 6, 14, and 28 weeks. Two- and three-way analyses of covariance in repeated measures were used to analyze the data. Since the sanguinaria products performed equally well in controlling plaque and gingivitis regardless of whether the teeth were polished, all subsequent analyses evaluated whole mouth means rather than separating the contralateral quadrants. The sanguinaria regimen was statistically significantly better than the placebo preparations in controlling plaque, gingivitis, and bleeding upon probing at $p < .0001$. These differences were observed at 6 weeks and were sustained throughout the remainder of the six month test. The sanguinaria regimen was equally effective in controlling the development of new plaque and reducing quantities of

existing plaque beyond that achieved by the placebo preparations. When the Plaque Severity Index³⁰ was applied, the sanguinaria regimen reduced the proportion of scores of 3 and greater by 61% at 6 months compared to the placebo group. No adverse effects were observed that could be attributed to the products. As described earlier, microbiological evaluation showed no adverse effects in the normal flora but did show shifts toward a healthier flora in the supragingival plaque.

A second six-month trial with the sanguinaria regimen was conducted by Kopczyk, Abrams, Brown, and Matheny³¹. The purposes of this trial were 1) to confirm the results of the Harper trial and 2) to establish the equivalence of the fluoride and sanguinaria dentifrice followed by the oral rinse with the non-fluoride and sanguinaria dentifrice followed by the oral rinse. This trial also evaluated the effects of the sanguinaria on the normal oral flora both during the trial and one month after the subjects stopped using the test products. This latter evaluation was conducted in order to detect any rebound effect. Subjects were selected to ensure substantial levels of plaque and gingivitis without signs of periodontitis.

Noninvasive indices were used for plaque and gingivitis. Bleeding upon probing was measured at baseline and at 2, 3, and 6 months. One hundred thirteen subjects completed the trial. There were statistically significant differences between active and placebo groups for plaque, gingivitis, and bleeding upon probing beginning at 2 months; these differences were maintained across all remaining data points ($p < .0001$). The two sanguinaria formulations of dentifrice when followed by oral rinse performed nearly identically for plaque and gingivitis. The fluoride and sanguinaria formula dentifrice followed by oral rinse performed statistically significantly better than the other active formula products for controlling bleeding upon probing, but this difference is not clinically significant.

One case of soft tissue irritation may be attributable to sanguinaria. No other adverse reactions could be related to product use. There were no adverse shifts in the microflora and no rebound effect was observed.

Discussion

These regimen studies provide assurance that the two sanguinaria formulations are compatible when used in a

sequence with minimal time lapse between brushing and rinsing. Chlorhexidine oral rinses should be used after the dentifrice has completely cleared the oral cavity (e.g., as long as 2 hours later), since the excipients can bind the active molecule³². Other oral rinses have been tested only with simple reference dentifrice systems³³⁻³⁷. These dentifrices may not challenge a given oral rinse's active agents the way many currently marketed dentifrices with sophisticated chemical systems may. As dentifrice formulations become more complex, their interactions with antimicrobials become more likely. Thus it is prudent to recommend a system or regimen approach to applying antimicrobials that has been tested as a regimen and that consistently reveals positive effects.

Conclusions

In summary, the seven clinical trials that evaluated the sanguinaria toothpaste and oral rinse combination consistently report significant reductions compared to controls. These reductions were observed for plaque and for gingival effects. Furthermore, these products can be used in combination either twice or three times daily without causing soft or hard tissue adverse effects and without disrupting the normal oral flora.

The combined-use regimen of sanguinaria toothpaste and oral rinse:

- is a compatible toothpaste/oral rinse regime
- consistently produces significant reductions in plaque, gingivitis and bleeding
- causes no adverse tissue effects
- does not disrupt the normal oral flora ▼

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TABLE 1.

Results of clinical trials reported on sanguinaria-containing products used in combination.

Citation	Formulations	Design	Indices	Results																					
Greenfield & Cuchel, <i>Comp Cont Ed Dent</i> Suppl. 5, pp 82-86, 1984	.03% SaE, 2.7% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse - Zendium toothpaste and water rinse	Single-blind crossover 2-week test period 2-week washout 60 subjects	Silness-Loe plaque index	Mean reduction in plaque index Sanguinaria .463 Zendium/water .240 Between-group differences are statistically significant (p<.001).																					
Nygaard-Oestby & Persson, <i>Comp Cont Ed Dent</i> Suppl. 5, pp 90-93, 1984.	.03% SaE, 2.0% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse 2.0% ZnCl toothpaste and .2% ZnCl oral rinse	Double-blind crossover 28-day test period 2-week washout 60 subjects	Silness-Loe plaque index Loe-Silness gingival index	Repeated measures analysis of covariance performed subsequent to publication revealed significant between-group differences (p<.001) and no carryover effect. <table><tr><td>Means (±s.e.)</td><td>Baseline</td><td>28 days</td></tr><tr><td>Plaque</td><td></td><td></td></tr><tr><td>Sanguinaria</td><td>1.273±.06</td><td>0.933±.06</td></tr><tr><td>Placebo</td><td>1.256±.06</td><td>1.022±.07</td></tr><tr><td>Gingivitis</td><td></td><td></td></tr><tr><td>Sanguinaria</td><td>1.294±.05</td><td>1.115±.02</td></tr><tr><td>Placebo</td><td>1.259±.05</td><td>1.156±.02</td></tr></table>	Means (±s.e.)	Baseline	28 days	Plaque			Sanguinaria	1.273±.06	0.933±.06	Placebo	1.256±.06	1.022±.07	Gingivitis			Sanguinaria	1.294±.05	1.115±.02	Placebo	1.259±.05	1.156±.02
Means (±s.e.)	Baseline	28 days																							
Plaque																									
Sanguinaria	1.273±.06	0.933±.06																							
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Placebo	1.259±.05	1.156±.02																							
Miller <i>et al.</i> , <i>J Clin Orthodont</i> 22:304-307, 1988	.075% SaE, 2.0% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse 2.0% ZnCl toothpaste and .2% ZnCl oral rinse	Double-blind crossover 12-week study 3-week pretest period, all subjects used placebo 9-week test period, subjects assigned to active or placebo products 44 orthodontic patients	Silness-Loe plaque index Loe-Silness gingival index	Means (±s.e.) Plaque Sanguinaria 0.674±.07 Placebo 0.595±.07 Gingivitis Sanguinaria 0.976±.04 Placebo 1.052±.03 9 weeks 0.400±.04 0.702±.07 p<.0001 0.467±.05 0.883±.06 p<.0003																					
Patel, A., Master of Science Thesis, St. Louis University, 1989.	.075% SaE, 2.0% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse - Placebo toothpaste and .03% SaE, .2% ZnCl oral rinse - Placebo toothpaste and .12% CHX oral rinse - Placebo toothpaste and placebo oral rinse	Double-blind, parallel groups 8-week test period 65 orthodontic patients	Quigley-Hein plaque index Modified bleeding on probing index Calculus incidence	Means (±s.e.) Plaque SaE regimen 2.893±.16 CHX rinse 3.158±.11 SaE rinse 2.864±.13 Placebo 2.781±.09 Bleeding index SaE regimen 1.844±.06 CHX rinse 1.846±.03 SaE rinse 1.753±.03 Placebo 1.730±.03 8 Weeks 1.824±.08 2.073±.06 2.121±.07 2.205±.09 1.322±.05 1.396±.03 1.400±.03 1.433±.04 Bracketed groups are not significantly different from one another (p<.05). CHX produced a 30% increase in calculus incidence; no increase was noted in SaE groups.																					
Hannah, Johnson & Kuftinec, <i>Am J Ortho Dentofac Orthop</i> 96:199-207, 1989.	.075% SaE, 2.0% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse 2.0% ZnCl toothpaste and .2% ZnCl oral rinse	Double-blind, parallel groups 6-month test period 24 orthodontic patients	Silness-Loe plaque index Loe-Silness gingival index Muhlemann-Son sulcular bleeding index	Means (adjusted) Plaque Sanguinaria .92 Placebo .92 Gingivitis Sanguinaria .94 Placebo .94 Sulcular Bleeding Sanguinaria .65 Placebo .65 6 Months .39 .68 .32 .76 .34 .70 Sanguinaria significantly more effective than placebo (p<.01) for all indices.																					

TABLE 1. (CONTINUED)

Results of clinical trials reported on sanguinaria-containing products used in combination.

Citation	Formulations	Design	Indices	Results
Harper <i>et al.</i> , <i>J Periodontol</i> 61:352-358, and 359-363, 1990	.075% SaE, 2.0% ZnCl toothpaste and .03% SaE, .2% ZnCl oral rinse - No SaE, no ZnCl toothpaste and no SaE, no ZnCl oral rinse	Double-blind, parallel groups 28-week study period 53 subjects	Quigley-Hein plaque index Lobene modified gingival index Bleeding upon probing	Means ($\pm$ s.e.) Baseline 28 weeks Plaque Sanguinaria 2.387 $\pm$.07 2.013 $\pm$.07 Placebo 2.351 $\pm$.06 2.519 $\pm$.04 Gingivitis Sanguinaria 1.959 $\pm$.01 1.495 $\pm$.04 Placebo 1.959 $\pm$.02 1.981 $\pm$.02 Bleeding on probing Sanguinaria 0.744 $\pm$.02 0.469 $\pm$.03 Placebo 0.747 $\pm$.02 0.818 $\pm$.01 Sanguinaria produced significantly lower scores for all indices compared to placebo ($p<.0001$).
Kopczyk <i>et al.</i> , <i>J Dent Res</i> 69:Abs. 1135, 1990.	.075% SaE, 2.0% ZnCl dical toothpaste and .03% SaE, .2% ZnCl oral rinse - No SaE, no ZnCl dical toothpaste and no SaE, no ZnCl oral rinse .075% SaE, .05% ZnCl, .8% NaMFP silica toothpaste and .03% SaE, .2% ZnCl oral rinse - No SaE, no ZnCl, .8% NaMFP silica toothpaste and no SaE, no ZnCl oral rinse	Double-blind, parallel groups 6-month study period 113 subjects	Quigley-Hein plaque index Lobene modified gingival index Bleeding upon probing	Means ($\pm$ s.e.) Baseline 6 months Plaque SaE 2.891 $\pm$.05 2.357 $\pm$.05 Placebo 2.910 $\pm$.05 2.720 $\pm$.04 SaE/NaMFP 2.886 $\pm$.05 2.327 $\pm$.04 Placebo/NaMFP 2.942 $\pm$.05 2.844 $\pm$.06 Gingivitis SaE 1.824 $\pm$.04 1.408 $\pm$.03 Placebo 1.835 $\pm$.04 1.694 $\pm$.02 SaE/NaMFP 1.841 $\pm$.04 1.400 $\pm$.03 Placebo/NaMFP 1.844 $\pm$.05 1.709 $\pm$.03 Bleeding upon probing SaE 0.708 $\pm$.03 0.461 $\pm$.02 Placebo 0.707 $\pm$.02 0.673 $\pm$.02 SaE/NaMFP 0.718 $\pm$.02 0.400 $\pm$.02 Placebo/NaMFP 0.701 $\pm$.03 0.670 $\pm$.02 Sanguinaria regimens were found to be significantly more effective than their respective placebo regimens ($p<.0001$).

The Impact of Chemotherapeutic Agents on Treatment Planning

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In evaluating dental research in the past decade, one could describe this era as a "renaissance" for topical antimicrobials. During this time a number of agents effective for the reduction of plaque and gingivitis were evaluated in longitudinal studies and found to be effective.

Although not all gingivitis proceeds to periodontitis, it is generally accepted that gingivitis is the precursor of periodontitis¹. Additionally, it has been established that plaque reduction, per se, is not a recognized reason for use of a product; concomitant with an observed reduction in plaque must be a reduction in disease. Otherwise the patient benefit is unclear. Since supra and subgingival plaque are interrelated, chemotherapeutic agents affecting one can be expected to have an impact on the other². With these concepts in mind, the practitioner has a variety of effective agents and regimens which can be incorporated into a dental disease control program for patients. The duration of use of a chemotherapeutic agent will vary among patients and should be tailored to each patient's needs³. For example, in my practice, a plaque control product is recommended



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for a three month time period for patients having difficulty with effective plaque control. Often included are patients with extensive fixed prostheses. At the end of three months of usage, the patient is re-evaluated, plaque is disclosed and soft tissues are evaluated. These evaluations are demonstrated to the patient. The patient is then told that this is the "endpoint" which must be maintained without a chemical agent, until his next 3 month recall appointment. At this next recall, if plaque and

gingivitis control is inadequate, the patient is again placed on a chemotherapeutic regimen. The rationale for this approach is that, although long term use of some agents has been shown to be safe, the additional cost to the patient is a consideration. Since no chemotherapeutic agents have been shown to replace mechanical methods of plaque control, these methods remain as the core of a patient's oral hygiene program.

Another group of patients who may value from antimicrobial dental products are those with medications which, as a side effect, cause xerostomia. In view of the aging of our population, it is anticipated that over 10% of our population will be on such medications in this decade. In addition to increased plaque, gingivitis and periodontitis, this population will be more prone to root surface caries^{4,5}. Therefore, when a dentifrice is selected for this special population, it is essential that it contain fluoride for delivery to root surfaces. Use of a non fluoride dentifrice could result in leaching out of surface fluoride with a resultant increase in not only root caries but also recurrent caries⁶. Another factor to be considered in this population is

TABLE 1

Oral Antimicrobials - Six Month or Longer Studies

	Number	Usage	# of Subjects	% Plaque Reduction	%Gingivitis Reduction	Anti-Candida Effect
Chlorhexidine	4	BID	1219	45-61	27-67	+
Essential Oils	6	BID	700	19-35	15-37	+
Cetylpyridinium Chloride	1	BID	99	14	24	+
Sanguinaria	2	BID ¹	215	-	-	+
	3	BID ²	204	17-42	18-57	
Stannous Fluoride	3	BID	913	0	0	-
	2	BID ³	145	0-77	45-72	

1. Use of dentifrice

2. Use of both dentifrice and mouthrinse

3. One study evaluated only abutment teeth and the other was in orthodontic patients

the predisposition to fungal infections, a finding related to a decreased volume of saliva with its associated antibacterial and antifungal properties. Therefore, oral care products with antifungal properties should be selected over those without this effect (Table 1).

Other systemic medications which require more intense plaque control are those which produce gingival hyperplasia. The most common drugs are the anticonvulsant phenytoin (Dilantin), an immunosuppressive drug, Cyclosporin, and a cardiac rhythmic stabilizer and antihypertensive, nifedipine (Procardia)^{7,8,9}. This later drug is in the family of calcium channel blockers and other drugs in this group have also been reported to cause hyperplasia although not as often as nifedipine. Since some studies have suggested that effective plaque control can minimize medication induced hyperplasia, especially when instituted in the first few weeks of therapy, antimicrobial chemotherapeutic agents should be recommended for these patients early in therapy^{10,11}. One report documents reversal of hyperplasia with an antimicrobial in a patient being medicated with cyclosporine¹². The various populations for whom chemotherapeutic agents are of value are summarized in Table 2.

In order to prove their effectiveness for the reduction of plaque and gingivitis, a product must be shown, in clinical trials with adequate numbers of patients, to be effective over a six month usage period in conjunction with normal oral hygiene. In this report, the status of various products and their effect on reduction of plaque and gingivitis is summarized in Table 1. Noteworthy is that one of the agents, sanguinarine, although not shown to be highly effective when used alone in a dentifrice or mouthrinse, has been shown to

phenomena may be related to (1) an enhancement of the antimicrobial activity of sanguinarine by other ingredients in the two compounds (2) an increased dosage (or duration) of agent being applied to plaque due to two-product usage, or (3) an increase in plaque surface area by dispersion due to brushing so that a greater surface area of plaque is exposed to the chemical's antibacterial action. These findings are deserving of further study and clarification.

Stannous fluoride has also been purported to have plaque and gingivitis reducing properties. However, as shown in the table, this property has not been well demonstrated in six month or longer studies with the exception of two studies in special populations^{15,16}. Recently, the American Dental Association cautioned dentists to be wary of claims of reduction of plaque and gingivitis by these products¹⁷.

Irrigation

Chemotherapeutic agents have been evaluated in short term studies with benefits on reduction of plaque and gingivitis reported with products containing chlorhexidine, essential oils, cetylpyridinium chloride and sanguinarine^{18,19,20,21}.

Only one six month study of the value of home use of a chemotherapeutic agent (chlorhexidine) when delivered by a powered oral irrigator has been published²². The results of this study showed that supragingival irrigation enhanced the effects on gingivitis reduction compared to rinsing with chlorhexidine or irrigating with water. This significant study has laid the groundwork for evaluation of the use of powered irrigators to enhance the efficacy of chemotherapeutic agents.

"This study also showed that, although irrigation with water did not reduce plaque scores it did reduce gingivitis at both clinically and statistically significant levels. This finding was first reported in 1972 by Lobene²³ and was not understood at that time. However, in view of our current knowledge of plaque, it is probable that irrigation with water may alter plaque metabolism, leach out toxic substances such as lipopolysaccharides on root surfaces, and reduce plaque thickness. This latter change would not be reflected using standard two dimensional disclosed plaque scoring systems."

Although irrigation with chemotherapeutic agents has been shown to be effective in the reduction of gingivitis, the role of this procedure in the treatment of periodontitis is unclear at this time²⁴. Also, unclear is the role of in office irrigation in the treatment of periodontitis. With the advent of specially designed tips for powered irrigators, which can be easily placed subgingivally by patients, research in this area may demonstrate patient benefits and is encouraged.

Summary

In this article the impact of chemotherapeutic agents on planning therapy for patients with plaque associated problems are reviewed. For special patients such as those receiving systemic medications which cause xerostomia or gingival hyperplasia, topical antimicrobials are of value for utilizing chemotherapeutic agents to teach patients a "clean mouth endpoint". Once achieved, patients can use this as a goal to obtain without the use of an agent.

Two mouthrinses have been clearly shown to be effective in reducing plaque and gingivitis; one contains chlorhexidine and the other essential oils. A third agent, sanguinarine, found in both a dentifrice and mouthrinse, appears to be effective when used as combined therapy and further studies of combined usage are warranted. ▼

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TABLE 2

Treatment Planning Special Patients and Chemotherapeutic Agents

Patients with poor plaque control laziness, poor dexterity, appliances

Medications causing hyperplasia

Medications causing xerostomia

Orthodontic appliances

Post-surgery

effectively reduce plaque when both the dentifrice and mouthrinse have been used consecutively by a patient^{13,14}. This

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Safety of Sanguinaria Extract As Used In Commercial Toothpaste And Oral Rinse Products

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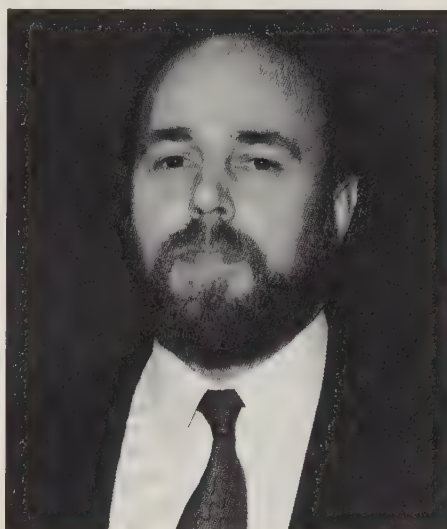
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SUMMARY

This report represents the findings of an Expert Panel on the safety of Sanguinaria extract used in Viadent® oral rinse and toothpaste products and represents an independent review of the Sanguinaria extract toxicologic data base. It is based on reviews and discussions of the data base by all members of the Expert Panel on Sanguinaria extract. The Panel concluded that the data base on Sanguinaria extract is substantial and indicates that Sanguinaria extract is safe in its present use in Viadent® products based on a large margin of safety between levels of human exposure and levels found to produce minimum effect or to be without adverse effect in animals. The panel further concluded that published literature suggesting an association between human exposure to Sanguinaria extract and potential reproductive, cardiovascular, or ocular toxicity, or carcinogenicity is largely anecdotal, unfounded, and not corroborated by or consistent with the substantial data base that was subjected to peer review.

Introduction

Extracts of the plant *Sanguinaria canadensis* L (bloodroot) have antibacterial, antifungal, and anti-inflammatory activity¹⁻⁴. Sanguinaria extract or sanguinarine chloride, the major benzophenanthridine alkaloid constituent of the extract, is an ingredient in manufactured products including toothpaste, mouthwash, cough and cold remedies, and homeopathic preparations. The variety of pharmacologic properties of benzophenanthridine alkaloids have made them particularly



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attractive for research and development of therapeutic pharmaceuticals.

In addition to sanguinarine chloride, extracts from *Sanguinaria canadensis* contain a group of closely related benzophenanthridine alkaloids. These alkaloids are primarily sanguinarine and chelerythrine with minor amounts of sanguilutine, chelilutine, sanguirubine, and chelirubine.

Toothpaste and oral rinse products containing Sanguinaria extract have been marketed under the trade name Viadent® since 1982 by Vipont Pharmaceutical, Inc., Fort Collins, Colorado. The use of these oral hygiene products as part of a daily complete oral health program has not resulted in any clinically severe or disabling adverse reactions or detriment to health as demonstrated by the results of clinical studies with over 300 volunteers and the low incidence of consumer adverse reaction reports.

The authors of this paper were assembled by ENVIRON Corporation to provide Vipont Pharmaceutical, Inc. an Expert Panel review of the Sanguinaria

extract toxicology data base and the safety of Sanguinaria extract for its present use in oral hygiene products. The panel included recognized experts in a variety of disciplines including toxicology, pathology, irritation/sensitization, risk assessment, and biostatistics.

Because of references to *Sanguinaria canadensis*, from which Sanguinaria is extracted, as a potential abortifacient, cardiovascular and ocular toxin, and carcinogen⁵⁻¹¹, the Panel was asked to give particularly close attention to these toxicity endpoints in their evaluation of the toxicological data base for Sanguinaria extract used in toothpaste and oral rinses.

This report presents the panel members' evaluation of the acute, subchronic, and chronic toxicity as well as reproductive, developmental, genetic, and clinical toxicity data on Sanguinaria extract, sanguinarine chloride, and/or oral hygiene product formulations using these ingredients. It concludes with the panel's assessment of the safety of using currently marketed mouthwash and toothpaste products that contain Sanguinaria extract.

Acute Toxicity And Irritation Potential

Sanguinaria extract, sanguinarine chloride, and Viadent® oral rinse and toothpaste have been tested for acute toxicity in animal studies employing various species and routes of administration¹²⁻²⁸. The design and results of acute toxicity tests are presented in Tables 1 and 2. The Panel concluded that the available data adequately characterize the acute toxicity of Sanguinaria extract and that acute toxicity results do not predict an acute health hazard to humans at the levels

used in Viadent® products.

Sanguinarine chloride (SaCl) and several Viadent® formulations containing Sanguinaria extract (SaE) have been tested for irritation and sensitization potential in animal studies²⁹⁻³⁹.

Sanguinarine chloride was slightly irritating in a primary skin irritation test²⁹; was mildly irritating in a primary eye irritation study³⁰; and resulted in no evidence of irritation in a 28-day oral mucosal irritancy study in dogs³¹. Viadent® oral rinse produced no irritation in a mucous membrane irritation study in hamsters³² and no allergic reaction in a repeated subcutaneous injection study in guinea pigs³³. A Viadent® 0.2% formulation tested in a mucous membrane irritancy study³⁴ using the hamster cheek pouch produced mucosal irritation in some animals which may have been the result of the abrading procedure rather than treatment with the Viadent® formulation. A summary of irritation and sensitization study data is presented in Table 3.

The Panel concluded that, overall, the data indicate that Sanguinaria extract levels present in Viadent® oral rinse and toothpastes present no irritation or sensitization hazard to humans under expected conditions of use. This conclusion is, furthermore, supported by

the results of clinical studies that have shown no clinically significant evidence of irritation, sensitization, or allergic response to these Viadent® products.

Subchronic Studies

The subchronic toxicity of Sanguinaria extract and sanguinarine chloride has been evaluated in rats and monkeys (Table 4).

Subchronic gavage studies in rats with Sanguinaria extract⁴⁰⁻⁴¹ showed evidence of dose-related toxicity principally involving gastrointestinal irritation and body weight loss at all dosage levels. The subchronic studies in rats indicated minor toxicity at 50 mg/kg/day (lowest dosage level tested).

A subchronic gavage study in monkeys with sanguinarine chloride⁴²⁻⁴³ given at doses ranging from 0 to 60 mg/kg revealed no treatment-related toxicity in any treatment group except emesis and diarrhea (i.e., gastrointestinal irritation), which were observed in animals for a limited time. The dose-related increase in emesis and diarrhea made it difficult to establish how much of the dose was retained and absorbed by each animal. However, emesis occurred sporadically only during the first five weeks, and not during the last eight weeks of the 13-week study. Therefore, animals received their full

dose of the test article for a majority of the study duration. Pathological examination failed to reveal any treatment-related effects. Keeping in mind that the gastrointestinal irritation (i.e., emesis and diarrhea) following administration of sanguinarine chloride by oral gavage was of limited duration, the Panel believes that the study suggests a toxicity NOAEL of 30 mg/kg/day once tolerance had been achieved.

Several short-term (2-4 week) studies in rats with both Sanguinaria extract⁴⁴ and sanguinarine chloride⁴⁵ reveal that the route of administration modulates the effects of the compound. Administration in the diet appears to protect against gastrointestinal irritation.

In summary, the Panel found that subchronic studies in rats and monkeys provided minor evidence of treatment-related toxicity associated with administration of Sanguinaria extract and sanguinarine chloride (at dosages greater than 30 mg/kg/day), which consisted primarily of gastrointestinal irritation.

Reproductive And Developmental Toxicity Studies

Sanguinaria extract was tested for reproductive and developmental toxicity in rats and rabbits (Table 5). The design

TABLE 1

Acute Toxicity Studies - Sanguinaria Extract

Species	Strain	Administration	Dosage Levels and Results
Rat	Sprague-Dawley	Oral (Gavage) (500 mg/ml H2O)	Dosage Levels: 500, 780, 1220, 1920, 3000 mg/kg LD50 (95% Confidence Interval): 1440 mg/kg (1040-2130 mg/kg)
Rat	Sprague-Dawley	Oral (Gavage) (250 mg/ml corn oil)	Dosage Level: 1140 mg/kg (extract of <i>Macleaya cordata</i>) Mortality: 2/10 rats
Rabbit	New Zealand White	Dermal (undiluted)	Dosage Level: 200 mg/kg LD50: >200 mg/kg (no mortality observed)

TABLE 2

Acute Toxicity Studies - Sanguinarine Chloride

Species	Strain	Administration	Dosage Levels and Results
Rat	Charles River CD	Oral (Gavage) (80, 120, 150, and 180 mg/ml 0.2% CMC)	Dosage Levels: 800, 1200, 1500, 1800 mg/kg LD50 (95% Confidence Interval): 1525 mg/kg (1364-1705 mg/kg)
Rat	Sprague-Dawley	Oral (Gavage) (100 mg/ml corn oil)	Dosage Levels: 1000, 1316, 2280 mg/kg LD50 (95% Confidence Interval): 1664 mg/kg (1572-1764 mg/kg)
Rat	Sprague-Dawley	Intravenous (10 and 40 mg/ml saline)	Dosage Levels: 5, 10, 20, 28, 40 mg/kg LD50 (95% Confidence Interval): 29 mg/kg (25-34 mg/kg)
Rat	Sprague-Dawley	Inhalation	Dosage Concentration: 0.16-0.37 mg/L for 4 hours; Time Weighted Concentration: 4-11.1 mg x min/L. Mortality - 3/5 males; 0/5 females. Conclusion: Mild Pulmonary and Ocular Irritant

TABLE 3

Irritation and Sensitization Potential

<i>Test Article</i>	<i>Species</i>	<i>Strain</i>	<i>Administration</i>	<i>Study Type</i>	<i>Results</i>
Sanguinarine Chloride	Rabbit	New Zealand White	Dermal	Primary Skin Irritation	Concentration: 0.1% Conclusion: Slight Irritant
Sanguinarine Chloride	Rabbit	New Zealand White	Ocular	Primary Eye Irritation	Concentration: 0.1% Conclusion: Mild Irritant
Sanguinarine Chloride	Dog	Beagle	Oral Cheek Pouch	Oral Mucosal Irritation	Concentrations: 0.1%, 0.3%, 1.0% Duration: 28 days, twice per day. Conclusion: Non-Irritating
Viadent Oral Rinse (2% SaE)	Hamster	Syrian Golden	Oral Cheek Pouch	Oral Mucosal Irritation	Duration: 5 days, once daily. Conclusion: Mucosal Irritation observed in some animals result of abrading procedure, not test article.
Viadent Oral Rinse (0.1% SaE)	Hamster	Syrian Golden	Oral Cheek Pouch	Oral Mucosal Irritation	Duration: 5 days, once daily. Conclusion: Non-Irritating
Viadent Oral Rinse (0.03% SaE)	Guinea Pig	Hartley-derived	Subcutaneous	Allergic Reaction/Shock Potential	Treatment: 5 consecutive days Dose Volume: 0.2 ml Untreated: Days 6-18 Challenge: Day 19 (0.2 ml) Conclusion: Negative; no allergic reaction elicited.

TABLE 4

Subchronic Toxicity Studies

<i>Species</i>	<i>Strain</i>	<i>Administration</i>	<i>Dosage (mg/kg/day)</i>	<i>Duration</i>	<i>Results</i>
<i>Sanguinaria Extract</i> Rat	Charles River CD	Diet	0, 5, 15, 45, 135, 405	28 days	Rangefinding study for chronic toxicity/oncogenicity study in rats. No mortality. Mean body weight reduction (high dosage level only).
Rat	Charles River CD	Oral (Gavage)	0, 50, 100, 200, 300, 400	90 days	Gastrointestinal irritation and body weight loss at all dosage levels. NOAEL <50 mg/kg/day.
Monkey	Cynomolgus	Oral (Gavage)	0, 50, 100, 150, 200	28 days	Rangefinding study for 13-week oral toxicity study. Mortality, body weight reductions, and clinical signs (i.e., emesis, diarrhea, inappetence) observed.
<i>Sanguinarine Chloride</i> Rat	Sprague-Dawley	Diet	0, 1.5, 4.5, 15	14 days	No test article related toxicity noted.
Rat	Sprague-Dawley	Oral (Gavage)	0, 0.06, 0.30, 0.60	30 days	No test article related toxicity noted.
Monkey	Cynomolgus	Oral (Gavage)	0, 10, 30, 60	90 days	Dose-related increase in emesis and diarrhea (GI irritation). Emesis sporadic during first five weeks of treatment only. Pathological exam - no treatment related effects. NOAEL = 30 mg/kg/day (once tolerance achieved).

of the reproductive and developmental toxicity tests conformed to the FDA Bureau of Drugs guidelines for reproduction studies issued in 1966. Specifically, Sanguinaria extract was tested in a fertility/reproduction (Segment I) study in rats, in developmental toxicity (Segment II) studies in rats and rabbits, and in a perinatal/postnatal (Segment III) study in rats⁴⁶. The results of the fertility/reproduction study in rats⁴⁷ included increased mortality and clinical signs, as well as body weight reduction

in adult high-dosage group animals (100 mg/kg/day). Clinical signs were also evident in the mid-dosage group (30 mg/kg/day) adult animals. Reduced pup body weight was observed in the high-dosage group only. No effect on reproductive performance parameters was observed. Results of developmental toxicity testing in rats⁴⁸ included rales and reduced body weight gain in high-dosage group maternal animals only. No developmental or teratogenic effects were evident. Developmental toxicity

testing in rabbits⁴⁹⁻⁵⁰ revealed mortality, weight loss, respiratory distress, and signs of morbidity in maternal animals at doses greater than 15 mg/kg/day. Postimplantation loss and a reduction in fetal and pup body weight was observed at doses greater than 25 mg/kg/day. However, no teratogenic effects were evident. The perinatal/postnatal study in rats⁵¹ revealed rales and reduced maternal body weight gain (high-dosage group, 60 mg/kg/day). No effects were observed on parturition or

litter parameters as a result of treatment with *Sanguinaria* extract.

In summary, *Sanguinaria* extract had no effect on fertility, reproduction, or fetal and neonatal development in rats and rabbits at doses below those resulting in general toxicity in the adult animals. Developmental toxicity, manifested as an increase in postimplantation loss and a slight reduction in fetal and pup body weights, was evident only at doses in excess of those that produced maternal toxicity. These studies are consistent with a developmental toxicity NOAEL of 25 mg/kg/day and a maternal toxicity NOAEL of 15 mg/kg/day. The panel concluded that the results of the reproductive and developmental toxicity studies do not predict any potential health hazard to humans even under exaggerated use conditions.

Cardiovascular Toxicity

The effects of *Sanguinaria* extract and sanguinarine chloride were evaluated at high doses in acute, subchronic, and chronic studies, and in a cardiovascular study in dogs treated intravenously⁵². There was no evidence of any treatment-related effect on heart function and no cardiac lesions were present. In addition, the panel reviewed two publications; one¹⁰ demonstrated the positive inotropic effect of sanguinarine (represents 35% of the *Sanguinaria* extract) on *in vitro* isolated guinea pig atria immersed in sanguinarine and another⁵³ demonstrated a dose-response

(0.5, 1.0, 2.0, 4.0 mg/kg) in ventricular refractoriness following vascular infusion of sanguinarine into anesthetized pigs. These last two studies were of an experimental nature and used test systems which measure direct effects on cardiac muscle following an electrical impulse and are not comparable to the physiologic response that would occur in unanesthetized whole animals.

In the aforementioned study of cardiovascular status conducted in beagle dogs⁵², sanguinarine chloride showed no effect on ventricular pressure, diastolic pressure, cardiac output, dp/dt, or respiratory rate. In addition, there were no changes in lead II EKG. The dosage employed in this study was 0.075 mg/kg given intraarterially. It is emphasized that this 0.075 mg/kg no-effect dose represents 30 times the worst case daily absorbed dose expected from brushing and rinsing with Vipont's products, as described in the following paragraph. In addition, the previously described subchronic (90-day) gavage study in monkeys in which sanguinarine chloride was administered at doses of 0, 10, 30, and 60 mg/kg/day, showed no effect on six lead (I, II, III, aVR, aVF, aVL) electrocardiograms recorded pretest, at week 1, and at months 1-3. In summary, there was no electrocardiographic evidence of drug effect in this study at daily oral doses up to 60 mg/kg/day.

If one assumes that the sanguinarine (i.e., alkaloid) present was completely absorbed following brushing and rinsing,

then the daily absorbed dose of alkaloid or sanguinarine from the extract would be approximately 0.02 mg/kg (i.e., 35% of 0.060 mg/kg; sanguinarine comprising 35% of the *Sanguinaria* extract). However, acute intravenous versus acute oral data indicates poor absorption of sanguinarine following oral administration. In addition, a preliminary oral C₁₄-labelled sanguinarine study in rats indicates only about 12% absorption following oral exposure. If a worst case assumption was made (i.e., entire 12% of the administered dose in humans is the target dose to the heart), the actual daily target dose of sanguinarine resulting from brushing and rinsing would approximate 0.0024 mg/kg and would provide a margin of approximately 200 times relative to the lowest dose used by Whittle *et al.* (i.e., 0.5 mg/kg). Moreover, if the same assumptions were applied to the subchronic monkey study data (i.e., entire 12% of the administered dose in monkeys is the target dose to the heart), then the highest target dose of sanguinarine in the monkey was 7.2 mg/kg, which is 3000 times the target dose estimated in humans, and yet it produced no cardiac effects. Therefore, the Panel concluded that the data base did not indicate a cardiovascular health hazard of *Sanguinaria* extract or sanguinarine to humans.

Ocular Toxicity

The Panel reviewed acute, subchronic and chronic studies, as well as two

TABLE 5

Reproductive And Developmental Toxicity Studies on *Sanguinaria* Extract

Species	Strain	Administration ^a	Dosage (mg/kg/day)	Study Type	NOAEL
Rat	Charles River CD	Oral (Gavage)	0, 10, 30, 100	Fertility/ Reproduction (Segment I)	30 mg/kg/day-litter parameters 10 mg/kg/day-adult animals
Rat	Charles River CD	Oral (Gavage)	0, 5, 20, 60	Developmental (Segment II)	60 mg/kg/day-developmental toxicity 20 mg/kg/day-maternal toxicity
Rat	Charles River CD	Oral (Gavage)	0, 5, 20, 60	Perinatal/ Postnatal (Segment III)	60 mg/kg/day-perinatal/post natal effects 20 mg/kg/day-maternal toxicity
Rabbit	New Zealand White	Oral (Gavage)	0, 5, 15, 25, 50, 75	Developmental (Segment II)	25 mg/kg/day-developmental toxicity 15 mg/kg/day-maternal toxicity

a Test Article Concentration: Rat studies, appropriate concentrations in 1% citric acid solution to allow dosage volume of 10 ml/kg; Rabbit study, appropriate concentrations in 1% citric acid solution to allow dosage volume of 4 ml/kg.

controlled subchronic studies in monkeys and dogs, that reported on the potential of sanguinarine to produce glaucoma⁵⁴. It has been hypothesized that sanguinarine is the single etiologic agent responsible for glaucoma in cases of epidemic dropsy as a result of consumption of contaminated argemone oil⁵⁻⁷.

Young adult cynomolgus monkeys were administered sanguinarine by gavage for 13 weeks at dosages of 0, 10, 30, and 60 mg/kg/day⁴³. Ophthalmoscopic examinations were conducted on all animals prior to the initiation of treatment and after 13 weeks of dosing. No significant differences were observed in intraocular pressure values or ophthalmologic observations when comparisons were made between treatment groups, sexes, or left and right eyes.

In addition, sanguinarine was administered to dogs by placement into premolar extraction sites following removal of upper and lower third premolar teeth⁵⁴. Each dog received a dosage of sanguinarine of approximately 20 mg/kg. Intraocular pressure measurements on both eyes were taken prior to extraction, prior to test article administration, and at 24 hours, 48 hours, 7 days, 15 days, and 21 days post-treatment. No significant increases in intraocular pressure were observed at any post-administration time period when compared with pretest measurements. It was concluded that sanguinarine administered to dogs in tooth extraction sites produced no detectable acute or transient effect on intraocular pressure over the 21-day post-treatment observation period.

In summary, studies examining ocular toxicity provided no evidence that Sanguinaria extract or sanguinarine chloride effected intraocular pressure (i.e., potential glaucoma) or produced any other ophthalmologic changes.

Genetic Toxicity Studies

Sanguinaria extract and sanguinarine chloride were tested for mutagenic potential in a series of assays using bacterial, mammalian cell culture, and mouse DNA systems. Sanguinaria extract and sanguinarine chloride elicited weak positive responses only in the bacterial assay using *Salmonella typhimurium* (Ames assay) in the presence of metabolic activation⁵⁵⁻⁵⁶. Studies of Sanguinaria extract were negative in the bacterial assay with *E.*

coli, in an unscheduled DNA synthesis assay in rat primary hepatocytes⁵⁷, and in a micronucleus cytogenetic assay in mice⁵⁸. An Ames test⁵⁹ for metabolites of Sanguinaria extract in rat urine using *S. typhimurium* was negative. Studies of sanguinarine chloride were negative in a second Ames assay⁶⁰ with *S. typhimurium* and *Saccharomyces cerevisiae* with and without metabolic activation. Two mammalian cell assays with sanguinarine chloride, including a Chinese hamster ovary (CHO) - HGPRT forward gene mutation assay⁶¹ and unscheduled DNA synthesis assay in rat primary hepatocytes⁶², provided results that were equivocal or uninterpretable; neither study, however, gave a positive mutagenic response. The Panel noted that the CHO assay is historically difficult to conduct and interpret.

The FDA has no specific test guidelines for genetic toxicity. For regulatory purposes, studies of genetic toxicity serve basically as a screen for potential *in vivo* interaction of the test material with DNA and induction of genetic damage. The Panel noted, therefore, that the current battery of genetic toxicity tests must be evaluated together with the results of long-term *in vivo* studies for chronic toxicity and carcinogenicity. A two-year gavage study of Sanguinaria extract in the rat and the 12-month interim results of a two-year dietary study in the rat produced no evidence of carcinogenicity.

Chronic Toxicity And Carcinogenicity

The chronic toxicity and carcinogenic potential of sanguinaria was examined through lifetime treatment of rats. Sanguinaria extract was administered by gavage at dosages of 0, 5, 20, and 60 mg/kg/day to 50 male and 50 female rats per group for 90-98 weeks. The study⁶³ was terminated slightly earlier than the two years planned for a rat cancer bioassay because of a higher than normal death rate for male control and high dosage female animals. Male animals were sacrificed at weeks 90 and 91 and female animals were sacrificed at week 98. The fact that most animals were treated for the majority of their lifespan and no evidence was found of treatment-related preneoplastic or neoplastic lesions was sufficient to support the conclusion that Sanguinaria extract was not carcinogenic in the rat under the conditions tested.

Non-neoplastic toxicity noted as decreased body weight, rales, and lung inflammation and congestion was evident in the high dosage group (60 mg/kg/day). The mid and low dosages (i.e., 20 and 5 mg/kg/day, respectively) did not produce toxicity and can be considered NOAEL dosages.

The Panel reviewed the 12-month interim report of an ongoing combined chronic toxicity/carcinogenicity study on Sanguinaria extract in the rat⁶⁴⁻⁶⁵. This study differs from the previous bioassay in that the Sanguinaria extract is being administered in the feed. The dosages being tested (up to 200 mg/kg) are higher than those of the previous gavage study and results indicate better tolerance by rats when the extract is administered in the feed.

To date, the only evidence of toxicity is a decrease in body weight at the high dosage level of 200 mg/kg/day. The Panel found no evidence of toxicity at the low and mid dosage levels as of the 12-month interim sacrifice and, therefore, these dosages (i.e., 8 and 40 mg/kg/day) are considered NOAEL dosages for chronic toxicity in the rat by the dietary route of administration. In addition, the Panel found no evidence in the long-term studies by gavage to suggest a carcinogenic effect related to Sanguinaria extract.

Human Clinical Studies

Six studies⁶⁶⁻⁷¹, comprised of a total of 300 volunteer subjects, were conducted to determine the irritation or sensitization potential of Viadent® oral rinse and toothpaste. Study protocols involved repeated application to the skin of human subjects under occlusive (toothpaste) or semi-occlusive (oral rinse) patch test conditions, evaluation of skin responses (i.e., erythema, edema), and challenge of an unpatched skin site after a 2-3 week rest period. The product formulations produced no evidence of clinically significant irritation or allergic contact dermatitis after repeated application to the skin under patch test conditions.

In addition, a double-blind, placebo-controlled clinical trial, involving 18 subjects, examined the potential of Viadent® dentifrice samples (toothpaste) to irritate or cause sensitization of the oral mucosal tissues under exaggerated use conditions⁷²⁻⁷³. Each subject was given a test material and instructed to brush all teeth, both upper and lower,

anterior and posterior, buccal and lingual for a total of 120 seconds/brushing, 5 brushings/day for seven consecutive days (i.e., exaggerated use conditions). Oral cavity examinations were conducted pre-treatment and on days 1, 3, 6, and 8. The seven-day treatment period was followed by a 14-day period of normal oral hygiene regimen. On day 21, subjects received an oral cavity examination followed by a 120-second brushing (challenge) with the test material. Oral examinations were again conducted at 30 minutes and 24-hours post-challenge brushing. No treatment-related lesions were reported or observed on the floor of the mouth, inner surface of the cheeks, the gingiva, tongue, inner surface of the lips or in the mucobuccal fold area of any subject during the course of the study.

The Panel concluded that the results of clinical studies of Viadent® formulations did not indicate irritation or sensitization in humans. Although Sanguinaria extract was not tested in human volunteers, the Panel concluded that it was appropriate to test the Viadent® product formulations in human subjects and that no additional clinical testing with Sanguinaria extract was needed.

The Panel reviewed 908 case reports provided by consumers either directly or through their dental referring sources. The total number of case reports (908) when compared to product(s) distributed represents a complaint rate of approximately 19 per million (0.00187%). Although we are unaware of any published complaint rates for this category of products, this report rate appears well within the range of what would be expected.

The largest single number of complaints were burning or stinging in the mouth. On the basis of the chemistry of the flavoring agents, it is likely that this represents non-immunologic contact urticaria (NICU). This is part of the signal (i.e., sensation), for which the flavoring agent is used. In these instances, the subject perceived a greater signal than most of the consumers that purchased the products.

The sloughing of epithelium noted by some subjects is a local phenomena, also reported with other dentifrices, and of no known systemic significance.

There was no evidence of a clinically severe or disabling adverse reaction among the 908 case reports reviewed.

In summary, no evidence exists that would suggest a sensitization or irritation potential for Sanguinaria extract as employed in Viadent® products.

Safety Assessment And Panel Conclusions

The Panel considered the design and conduct of studies on Sanguinaria extract and sanguinarine chloride to be acceptable for assessing the safety of Sanguinaria extract for its present use in Viadent® products.

The data base on Sanguinaria extract is substantial and covers areas of acute, subchronic, and chronic toxicity (including carcinogenicity), as well as cardiovascular, ocular, reproductive, developmental, genetic, and clinical toxicity (e.g., irritation/sensitization). It was the consensus of the Panel that appropriate studies were conducted to adequately address all safety issues routinely assessed for such products and relevant to the safe use of Viadent® products and their key ingredient, Sanguinaria extract. Estimates of the expected human exposure to Sanguinaria extract from Viadent® products can be made based on four daily uses of toothpaste and twice daily use of oral rinse. Each brushing employs 1 gram of toothpaste (containing 750 µg Sanguinaria extract per gram) and each rinsing consists of 30 milliliters or oral rinse (containing 300 µg Sanguinaria extract per milliliter). This exposes the user to approximately 21 milligrams of Sanguinaria extract applied daily to the oral cavity. It is estimated that 20 percent may be retained following expulsion of the residues of brushing and rinsing. If the average 70 kilogram human then retains approximately 4.2 milligrams of Sanguinaria extract, the estimated exposure is 0.060 mg of Sanguinaria extract per kilogram body weight on a daily basis (i.e., 0.060 mg/kg/day). A 250-fold safety margin exists between the NOAEL (15 mg/kg/day) in the most sensitive study (i.e., reproductive and developmental toxicity) and the highest anticipated exposure level to Sanguinaria extract (0.060 mg/kg/day).

Furthermore, the panel concluded that the published literature suggesting an association between human exposure to Sanguinaria extract and potential reproductive, cardiovascular, or ocular toxicity or carcinogenicity is largely

anecdotal, unfounded, and not corroborated by the substantial data base subjected to peer review.

Based on the evaluation of the data presented and on the discussions of the entire panel, the consensus of the Expert Panel was that Sanguinaria extract is safe for its present use in Viadent® oral rinse and toothpaste products based on a large margin of safety between levels of human exposure and levels found to be without adverse effect in animals. ▼

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The Canadian Dental Association serves the dental profession — and through the profession the Canadian public — as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all those interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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[†] Supragingival Calculus Formation Study: "A Study to Compare the Effects of Two Dentifrice Products on Adult Supragingival Dental Calculus Formation" 1989. Data on file, SmithKline Beecham Canada.

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Cover Photo

The scene on the cover of this edition of the JCD is a geographic feature of the northern (Gulf St. Lawrence) coastline of Prince Edward Island, called Kildare Capes. The photo is by Bruce Paton.
(Courtesy of the federal Regional Industrial Expansion department.)

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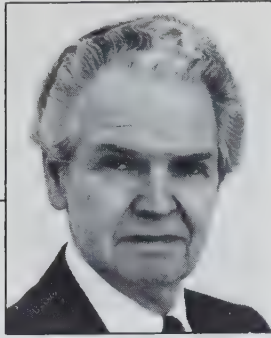
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GRATITUDE

At one of many spring university convocations, several graduates devised an ingenious method of expressing gratitude. Although not entirely dignified on such a solemn occasion, they carefully outlined on their mortar boards a masking tape message, "Thanks Mom & Dad".

The occasion was reminiscent of another graduate from former years. Classified a "mature student" – indicative of starting dental school some 10 years after high school – the qualifying degree was earned with a struggle beyond the normal travails of a dental education. When requested to say a few words at a farewell luncheon the new graduate humbly stated, "If it wasn't for my wife's money and my mother's prayers I wouldn't be here today!"

It is hoped that gratitude expressed at convocations is not a fleeting entity, forgotten as the endeavors of the "real" world are encountered. Dentists have much for which to be thankful. Not only for the teachers and leaders of today but for also those in the past. So many have struggled and sacrificed to advance professional excellence.

How often are the courageous and eminent of yesterday and today silently thanked? Indulging in our own daily efforts, (often pretty insignificant), do we too quickly disregard appreciation?

Pierre Fauchard, the founder of modern dentistry, was not remiss in sensing his obligations. In 1715, referring to the chief surgeon in the Royal Navy under whom he worked, Fauchard wrote, "To him I owe the first rudiments of knowledge I have acquired in the surgical specialty which I practice and the progress which I have made under this able man gave me the emulation to further important discoveries."

The contributors to today's dental success story are legion. All cannot be enumerated but several deserve particular recognition – some contributions reached the very limits of a supreme sacrifice

Horace Wells, who introduced the world to "surgery without pain", committed suicide. The anguish and melancholy caused by lack of recognition was too much for so sensitive a person. Edmund Kells, the first dentist to use X-Rays in dentistry, eventually took his own life rather than undergo further surgery to halt the radiation cancer that had already claimed his right arm.

Charles Goodyear, the developer of the rubber process "Vulcanite", died penniless and destitute following years of litigation inflicted by greedy individuals. A similar fate was met by William Taggart the inventor of the casting machine.

Scientists, teachers, clinicians; the dedicated from past years such as G.V. Black, Edward Angle, Willoughby Miller, James Leon Williams, William Gies, (and so many others), toiled ceaselessly for our profession. Comparable unselfishness is extended daily in the name of dentistry for the enhancement of the world's quality of life.

May our lives never become so complex that we fail to be grateful to those who have given so much.

"He that urges gratitude pleads the cause both of God and men, for without it we can neither be sociable nor religious." – Seneca

P. Ralph Crawford, BA, DMD

Editor: the Journal of the Canadian Dental Association

President's Column



Thanks for the Memories

With summer quickly coming to an end, and along with it my tenure as the seventieth CDA President, I have been reflecting upon the events of the past year. There seems to have been a million meetings, numerous on-going debates and more things to do than time and energy would permit. Still, I look back with pride at some of the accomplishments during my term of office. I took a special interest in specific areas but nothing can be achieved without an effective team effort. I am grateful for the advice and assistance of my colleagues on the Management Committee and Executive Council. I also wish to recognize the contribution of CDA staff members; all projects and initiatives depend in the long run, upon staff efforts to implement decisions or to follow-up on developments. I truly appreciate their hard work and support.

There are several areas where special progress has been made in the last year. I am proud of what has been achieved with respect to CDA's ability to communicate with members. The successful publication of our first annual report comes to mind, along with the development of the new CDA logo — the Maple Leaf in motion. Each CDA Communiqué is now not only read but saved for future reference and the CDA Journal continues to be the pre-eminent dental publication in Canada. Communication with our membership is a recognized priority and the CDA staff has been expanded to support its continuing achievement.

A previous President, Dr. Ralph Crawford, referred to CDA's involvement in the accreditation process for dental education as "a sacred trust". I made it a priority to reinforce the visible autonomy of the accreditation process and to transfer the foundation of its financial support from the membership self-interest part of CDA (membership dues) to the professional dimension (grants from Licensing Authorities). I believe that the accreditation process now has an unambiguous arms-length relationship to CDA while it continues to be protected under the CDA Constitution.

It is also a pleasure to realize that the Electronic Data Interchange is now a reality with the official launching planned for the CDA annual convention in Ottawa. And what a convention. CDA conventions, thanks by and large to our friends in Alberta and British Columbia, have become the scientific forum for dentistry as well as the nucleus for family vacation plans for a good number of CDA members across the country. Our annual meeting in Ottawa (scheduled for August 26-29) promises to be the best yet, as we welcome our military dental confrères from across the country.

President's Column

I take particular pride in the emphasis that has been placed upon enhancing communications with our auxiliaries. A forum has been initiated for discussion of common concerns with the Association of Canadian Faculties of Dentistry and the National Dental Examining Board of Canada. I am also pleased with the superb work done for our membership in the area of government relations. We obtained exempt status regarding the General Sales Tax and expanded our already excellent relationships with Health Minister Perrin Beatty and his staff. As a small-town boy who never learned the virtues of deficit financing, it is great to be able to announce that we once again achieved a modest surplus in our 1989 financial report. Finally, it gives me satisfaction to see what is happening at our newly renovated Headquarters building in Ottawa, including our dental library facility which is recognized as an outstanding resource. The dramatic changes in the building seem to me to be symbolic of the vitality and growth of your national association.

I claim no personal credit for the above developments, I do sincerely take pride in all that has been done this year. It has been a very great pleasure to work with a team composed of such hard-working and dedicated individuals as Drs. Jack Niedermayer, Gilles Dubé and Les Allen. I want to extend my very best wishes to Gilles as he dons the Chain of Office and the responsibilities that go with that symbolic chain. I also extend a warm welcome to our new Vice-President, my good friend Dr. Bernie Dolansky and his replacement, an individual I recruited to organized dentistry — the new Executive Council member from Ontario, Dr. Jim Brookfield.

Thanks for allowing me to live out a dream, a dream that began in my student days, when I had the opportunity to serve as CDA student governor at the University of Toronto. Since then, I have been able to continue to work with organized dentistry as Chairman of the Fourth Dental Student's Conference in Vancouver, President of the Ontario Dental Association and finally as President of the Canadian Dental Association. I am grateful to have had the chance to repay my chosen profession for the good life that dentistry has provided for me and my family and for the opportunity to work with so many dedicated individuals supporting dentistry at the national level. Thanks for this opportunity, thanks for the memories.

*Kevin L. Roach, BSC, DDS
President of the Canadian Dental Association*

RCDS — Yesterday, Today and Tomorrow

An Interview with Dr. Kenneth F. Pownall

P. Ralph Crawford, BA, DMD

After twenty-five years of exemplary service, Ken Pownall stepped down from the position of Registrar of The Royal College of Dental Surgeons of Ontario on July 1st. Often referred to as "Canadian dentistry's senior statesman", Dr. Pownall has left a legacy of wisdom and fair-mindedness to succeeding generations of dentists. The Journal Editor visited Dr. Pownall shortly before he vacated his offices at 230 St. George Street in Toronto. The interview that follows is merely a "window" into the life of a man whose understanding and kindness impressed so many.

Journal: Ken, how did you first get involved in organized dentistry?... After all, you've just completed a quarter of a century as Registrar with the RCDS.

Pownall: Fate plays a role in your life. One of my teachers at the University of Toronto was Dr. Sandy MacGregor. He was always on the alert for students with potential and would continue to encourage them after graduation. He'd invite them along to the many public meetings at which he spoke. He sort of continued the educational process even after the student left the classroom. Upon graduation in 1951, I practised in the outposts of Newfoundland for a year. When I returned to Toronto, Dr. MacGregor was one of the first to call me. He was quite direct... 'Ken, now that you have some experience in Public Health Dentistry, how about getting on the Public Health Committee of the ODA?'

Journal: So his encouragement guided you into organized dentistry?

Pownall: Yes, Dr. MacGregor's direction tilted me towards it, and being on one committee rather led to another. It wasn't long before I was a Governor on the ODA Board. I also enjoyed the role of clinical teacher on the Dental Faculty and was on the dental staff of the Hospital for Sick Children for ten years.

I suppose my profile in organized dentistry had grown, so when the posi-



Dr. Pownall, right, responds to a question by JCDA Editor Dr. Ralph Crawford during the interview.

tion at the Royal College became vacant, my name came up.

The Registrar at that time was —

Journal: Dr. Wesley Dunn, is that right?

Pownall: Yes, and my replacing him was a bit of a coincidence. Wes Dunn had been Registrar for over eight years but on very short notice was appointed Dean of the new Dental Faculty in London, Ontario. Dr. Jim Purves, V-P of the Royal College at the time, was in charge of the Registrar Search Committee. He invited me to apply. At first, I wasn't really interested at all. I had recently purchased a new home and a new office. It didn't seem to make much sense to change my career. But after talking to Wes Dunn, I found myself becoming more and more intrigued. I had started by questioning whether I could really handle the position. By the time our talk was over, I was saying to myself, 'If I don't accept the challenge, I will always wonder if I could have done the job'. My wife, Nora, and I talked it over and decided, with some concern, to sell my practice... It was quite a decision. Our younger son was a year old and our other two children were in elementary school.

Journal: It must have been a difficult decision. Were you heartened by the longevity of the Registrar's position? I mean, the College's Registrars have historically held office for very long periods of time.

There have been ONLY five Registrars since the College was founded in 1868.

Pownall : That's true. There have been only five Registrars since the College was founded in 1868. But I don't think that that was a consideration for me at the time.

Journal: What was it like when you became Registrar? For example, how many were on staff at the time?

Pownall: There was a staff of six. Myself and my secretary were full-time and four people who were on part-time status. Actually, the RCDS was involved in things it ought not to have been involved in. For example, the RCDS was the Corporate Body of the CDA and because the CDA was right

next door and Don Gullett [Secretary-Treasurer of CDA] was close by, the RCDS by osmosis became much involved with the CDA. Today our staff totals 24. We've taken over the whole building and still haven't enough space.

Journal: Can you recall any particular problem that confronted you when you began in 1965?

In the early days, most of the complaints could be handled over the telephone.

Pownall: One of the real problems involved disciplinary procedures. Hearings were quite informal and unofficial. Sometimes the dentist in question and his lawyer didn't even attend the hearings. You can't really judge a person in absentia when a license or ability to practice is in question.

When I started, there wasn't even a complaints committee. The hearings were mediation-oriented.

So it was pretty loose. This was changed in 1971 when the Statutory Powers and Procedures Act was proclaimed. It set down all the procedures that must be followed.

Journal: Did the complaints committee hear typical or average complaints?

Pownall: Oh yes. But it's the changes in the public's attitude that are interesting. In the early days, most of the complaints could be handled over the telephone. I remember one case in which a lady complained about a dentist taking out the wrong tooth. I mentioned that probably the dentist felt as bad as she did about it. She said, 'You're probably right. I was nervous and moved around a lot and didn't make it easy for him. Maybe God wanted me to have that tooth out anyway.'

Journal: That's not something you would hear today.

Pownall: Not likely. The patient would be at the lawyer's office on the way home from the dentist's office.

Journal: How about the number of discipline cases... I bet you've witnessed big changes there?

Pownall: As far as real 'heavy duty' discipline goes, we might have had two

or three during my first couple of years as Registrar. In 1989, we had 17 cases — not including the appeals before the Supreme Court of Ontario.

Journal: About what time did this 'loose' mediation practice become formalized?

Pownall: In the early days, the Registrar was the complaints committee. He talked to the patient and filtered the complaints. In 1973, the process became much more businesslike with the introduction of public representatives on the committee, and in 1975, the Health Disciplines Act became law.

Journal: A substantial portion of your duties as Registrar involves new dentists coming into the province.

Pownall: Foreign dentists have always been interested in coming to Ontario. Prior to the NDEB, the RCDS conducted its own examinations for foreign dentists twice a year. It was a two-and-a-half day examination. It was amazing; we were able to get a good overview of the candidate's ability to practice.

Eligibility for taking the exam was limited, though. We examined people from the States and former Commonwealth countries only. All others had to return to dental college.

Journal: The NDEB now oversees all of Ontario's examination responsibilities?

Pownall: Yes. In the days when each province conducted its own exams, it was interesting to see candidates who had failed in Ontario attempt exams in other parts of the country. We registrars have always exchanged information and we could almost track a candidate's endeavours from one province to another.

Eventually, they would pass somewhere. It didn't make much sense for each province to be 'going it alone'. Today the NDEB plays a very important role with standards that apply across the country.

Journal: Can you recall a particularly low period in your career; an event that was disappointing?

Today the NDEB plays a very important role with standards that apply across the county.

Pownall: Like life in general, there is a series of ups and downs. When I came on the scene, the ODA was a minor organization. Its entire budget came from the profit of the annual May Convention.

The ODA Board of Governors was often made up of very nice, older dentists, who, when they wanted to get off the Board, anointed someone else. It was rather self-perpetuating. . . an 'old boys club'. Nevertheless they did a good job. However, by the 1960s, there was a feeling that the ODA didn't have enough grassroots input. By 1964, dental professionals were beginning to pressure the RCDS to separate from the CDA. The CDA was a voluntary organization of dentists, yet it was funded by the license fees of the RCDS. Matters within organized dentistry weren't quite right and the debate centred on two issues: The RCDS shouldn't be involved with the CDA and the 'old boys club' should be 'disbanded'.

When I came on the scene, the ODA was a minor organization. Its entire budget came from the profit of the annual May Convention.

Journal: How were dentists in general feeling about all this?

Pownall: Dentists are basically conservative and many didn't want organizational changes. Emotions ran high. At the time, I may have been worried and upset that the three organizations (the CDA, the ODA, and the RCDS) might not get going with the right intent — the interests of the dentists on one hand and the protection of the public on the other. Following a series of meetings, things soon fell into place. The ODA was to be an entirely separate body — the 'voice of dentistry' — while the mandate of the RCDS was to be the protection of the public.

Journal: Aren't there provinces still 'wearing two hats' — association and public? How long is this going to continue?

Pownall: It can't continue much longer. When talking to other Registrars in Canada, I encourage them to have two organizations. How can you

justify negotiating fee guides with the government — guides which are certainly in the best interest of the dentist — while at the same time administering an Act designed for the best interest of the public? Often the best interests of the dentist and the public coincide, but sometimes they don't.

How can you justify negotiating fee guides with the government while at the same time administering an Act designed for the best interest of the public?

Journal: But none of the Western provinces seem concerned about licensing and discipline procedures — governments, public, and dentists seem equally unconcerned.

Pownall: Actually, I'm surprised at the lack of concern, but I predict that it will come. In fact, I would like the dental profession to show leadership rather than have the initiatives come from another quarter.

Journal: How many now serve on the Board of the Royal College of Dental Surgeons?

Pownall: There are 16 altogether: nine dentists are elected from the eight electoral districts, each of our two dental schools has a representative, and five lay people are appointed by the government.

Journal: Has a public representative ever been President of the Royal College?

Pownall: We are fortunate to have in Ontario a very fine group of people who are willing to serve on committees and boards... No, a public rep has never been President, although I know of nothing in the Act that would exclude that. The other hand, I don't know of any who would aspire to the position. They would have to know many technical things about dentistry. However, their input is extremely beneficial and gives us much more credibility. I certainly don't hear 'you dentists always stick together' as often as I did when I first became Registrar.

People used to think it was hopeless to lodge a complaint. When a patient comes before the complaint committee, the public representative usually starts the meeting with 'Just so you are aware, I am not a dentist and have nothing to do with the dental profession. I and the other representatives are here to see that you receive a fair hearing.' This usually cools the patient down?

Journal: So the system works?

Pownall: The system works.

Journal: Is there an auxiliary on the board?

Pownall: That is a very good question. We have been licensing dental hygienists since 1951. Until the late 60s, hygienists showed very little interest in the RCDS other than paying their annual license fee of \$2.00. At that time, the Ontario Dental Hygienists Association wasn't very active compared to today.

When the Health Disciplines Act was enacted in 1975, there were only about 625 hygienists in the province. There was only one school and that was at the Faculty of Dentistry of Toronto. Today in Ontario, there are 11 accredited training centres and approximately 4,000 hygienists on the register.

Journal: There's a proposal coming up that will give hygienists their own licensing body in Ontario.

Pownall: Yes, you can take that as a fact. The Government is now preparing legislation to create a College of Dental Hygienists.

It should take effect within the next year or two.

Journal: How do you feel about it?

Pownall: You know, dentistry involves only a few cubic inches of anatomy and, right now in Ontario, we have a Denture Therapists Act, a Dental Technicians Act, a Dentistry Act, and soon a Hygienists Act. Originally, I'd thought one umbrella act with all of us working harmoniously would be in the best interest of the public. Now, the more I think about it, the more I feel that I was naive. Years ago, when we

suggested that the RCDS have an umbrella act covering dentists and denture therapists, there arose the matter of civil rights. At the time, Mr. Justice McRuer, Commissioner of 'Inquiry into Civil Rights', very strongly stated that no self-governing body should have statutory control over others who are not members of the body. I am convinced that there should be separate Colleges. I am sure cooler heads will prevail and we will still be able to work together.

Journal: And how do you see this affecting the typical dentist's office?

Pownall: If things go the way they seem to be headed at present, I don't think it will make any difference. Hygienists will simply pay their license fee to their own College rather than the RCDS.

Some dentists equate a College of Dental Hygienists with independent practice. I don't think the majority of hygienists are interested in that at all.

Some dentists equate a College of Dental Hygienists with independent practice. I don't think the majority of hygienists are interested in that at all... I don't have the doom and gloom attitude that many people have on the subject.

Journal: The total picture in Ontario has been under review for seven or eight years by the Schwartz Commission. What changes do you see ahead for dentistry?

Pownall: Mr. Schwartz presented recommendations to the Minister in January 1989. Generally speaking, the single biggest change in legislation will replace the licensing of dentists with the licensing of dental procedures. I will not be a licensed dentist as such, but I can perform certain licensed acts — such as cutting hard and soft tissue — because I am a dentist. There will be about nine or ten of these 'licensed activities' that only dentists will be able to perform.

Journal: How will this work exactly? It seems to be splitting professional hairs in a rather risky fashion.

Pownall: I am uneasy about this, certainly. Prophylaxis, for example, will not be a licensed activity which means that anyone can perform a dental prophylaxis. Will we have beauty parlours where a lady can go to have her hair done and her teeth cleaned, all in the same environment? We have spent 100 years trying to establish dentistry as a science. Will it now be looked upon as a cosmetic thing rather than a science?

Will we have beauty parlours where a lady can go to have her hair done and her teeth cleaned, all in the same environment?

Our lawyers are concerned. The new legislation is so vague that unqualified people might get away with performing some dental procedures, because it would be difficult for us to prosecute. Our medical confrères are extremely upset; they feel that it is opening the door for quacks to practice medicine.

Journal: What is the Minister's attitude towards this?

Pownall: We have tried our best to impart our concern to the Minister, but she feels that more competition is needed in health care. She said that we can give the legislation five years to see if it works; if it doesn't, she says that it can always be changed on short notice.

Journal: It seems like a fuzzy crystal ball to us!

Pownall: A lot of us think so, but I have to agree with the Minister. We'll only know if it works once we try it. There is no precedent for this concept anywhere in the world. Mr. Schwartz has received positive feedback from countries worldwide. His feeling is that this may be the leading edge of all future health legislation.

Journal: One last question about this legislation: if enacted, how will it affect the more than a thousand non-Canadian dentists who aspire to be licensed practising dentists? Will Ontario be inundated with them?

Pownall: I am sure that Mr. Schwartz would say absolutely not. The RCDS would still decide who will or will not be allowed to practice in Ontario. My fear is that an unregistered dentist from another country will perform prophylaxis while employed in a beauty salon, saying, 'While I'm at it, I'll just smooth the corner of this tooth.' It will be tempting and the setting will not be quite as legally clear as it is now.



Journal: How do you feel about mandatory continuing education? Some provinces have the legislation and others don't. What's the story in Ontario?

Pownall: This will be the major change in dentistry in the next ten years. Our government has said that within three years of the enactment of the new Dentistry Act, we must have structures in place to demonstrate that all our dentists are maintaining competence. We have a committee at this very moment actively trying to set guidelines. The Ontario government of today is very strong on dentistry assuring the public that we are competent. Yet, the government feels that mandatory continuing education is not the whole answer — and there is nothing in the literature to support the theory that it is the answer to assuring competence.

This movement is not new, by any means. In 1970, there was a recom-

mendation before Council that suggested every dentist sit a competence exam every five years in order to maintain a license. The logistics alone were awesome. Today, with over 5,000 dentists, we would have to examine over 1,000 a year.

Journal: Speaking of competency, what about profiling — a system whereby dental practice can be monitored? What do you think of profiling?

I think many of us will always be concerned about 'someone looking over our shoulder', but I wouldn't be surprised to see profiling increasingly play a role with licensing authorities.

Pownall: Dr. Brian Rocky, the Registrar at the College of British Columbia where profiling is used, tells me that they have very few problems. The system tracks the number of procedures performed in an office. If the insurance profile sets off an 'alarm', and the dentist can provide an acceptable explanation, then he or she has nothing to worry about... Of course British Columbia has so few insurance carriers, it simplifies things. In Ontario, we have well over 100 carriers.

I think many of us will always be concerned about 'someone looking over our shoulder', but I wouldn't be surprised to see profiling increasingly play a role with licensing authorities and how they view practitioners.

Journal: Quebec is probably the only province where offices are actually inspected. Do you see inspection becoming prevalent?

Pownall: I really don't know how you can make certain a person is competent without visiting his or her office. I would think that by the next century, it is quite possible that someone will visit you to ensure that you're delivering up-to-date care.

Journal: At the moment, the RCDS takes action only if a complaint has been made — by either a dentist or a patient. Is this method effective?

Pownall: That's right, action is taken only on receiving a complaint. And,

yes, I have to admit that it's really not very satisfactory. I remember reading in the ADA Journal that for every complaint received, there were an estimated 100 complaints that are not reported. I guess, if we call ourselves dentists with licences to practice, the public has every right to question our qualifications and methods. The complaints system must always be readily accessible.

Journal: What about the status of dental education, today in the early 90s? Is the education of today's dentists still serving the public well?

Pownall: I don't know that dental education has really changed all that much. I am quite certain, though, that the students of today are better educated than I think our class was. Dental education is still too departmentalized, however. In our Ontario dental schools, there seems to be friction between some research people and those teachers who are clinically oriented... Probably one way of measuring the quality is to ask if recent graduates' work generates more complaints. I would have to say no.

Probably one way of measuring the quality is to ask if recent graduates' work generates more complaints. I would have to say no.

Journal: So all levels of the profession are subject to complaints?

Pownall: Yes they are, so I can't be that critical of education today. However there isn't anything that can't be improved.

There is another factor to consider about modern dental practice. Ten years ago, the majority of a graduating class immediately set up practice on their own. Today that would be the exception. Graduates have some of their 'rough spots' smoothed off as they choose to spend more time with experienced practitioners.

Journal: Then this is a relatively new part of the educational process?

Pownall: Probably, yes and no. It depends on who the graduate associates with.

Journal: Besides quality, what about quantity? Do you think we have too many dentists in Ontario, in Canada?

Pownall: It is a very difficult thing to read. When I drive around Toronto, see all those monstrous apartment blocks, I think there must be thousands of people each with 32 teeth with, I'm sure, all kinds of problems — I think there will never be a 'busyness' problem. However, there are 2,000 dentists in Toronto and some are not busy... Certainly the decrease in the caries rate has made a tremendous difference. I understand that the average 17-year-old in Toronto has two fillings. At one time, we had thought there would be a prevalent periodontal problem, but we are told that, today, 50 percent of Canadians have no periodontal disease.

Journal: With the oversupply of dentists and a decrease in periodontal disease and caries rate, is there more competition among dentists for patients? And if so, should dentists be allowed to advertise and 'market' their services? Do you see changes coming in that area?

Pownall: Like at 60 miles an hour! I think our regulations in Ontario are super strict. And I believe that it is a swing of the pendulum back to the turn of the century when open advertising was prevalent in Toronto. Our government said to me, 'Where's the harm in Dr. Crawford advertising an extraction for \$10.00 when everyone else is charging \$12.00? Doesn't the public have the right to know that his dental services are available at a lesser fee?' Or, 'what's wrong with Dr. Crawford placing a daily newspaper ad announcing his office is open Sundays?' The point is, it's not bad from the public's point of view. What concerns me is the pendulum swinging right back to the \$10.00-off coupon for Saturday night specials.

Journal: So what's the trend for Ontario?

I believe that it is a swing of the pendulum back to the turn of the century when open advertising was prevalent.

Pownall: I believe the trend in Ontario, for medicine, for law, and for dentistry, is that if it is true, verifiable, and in good taste, then you can literally say anything you want. We will definitely see changes in this area in the near future.

Journal: Ken, what about changes in malpractice litigation?

Pownall: I've seen major changes in this area. In the 1960s, we might have had five or six cases a year and never for huge amounts of money. This year, we will probably have about 300 new files opened.

We are living in a litigious society — anybody can sue anybody, nowadays. Twenty years ago, a lawyer would call my office after conferring with a client and seek advice on whether the claim had any basis. Today, many lawyers will issue a writ, telling their client, 'you may get something out of it.' Unfortunately, many cases are settled as nuisance claims because it costs too much to go to court. Another consideration is that, today, dentistry is much more sophisticated than it used to be.

Unfortunately, many cases are settled as nuisance claims because it costs too much to go to court.

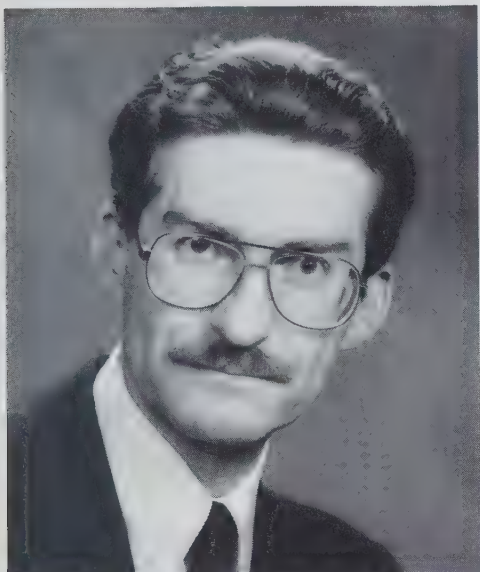
Journal: How can malpractice suits be avoided, in your opinion?

Pownall: I think I invented the expression 'Inform before you perform'. That is still the best motto for prevention of problems in dentistry. Communication is still the very heart of good dentist-patient relationships.

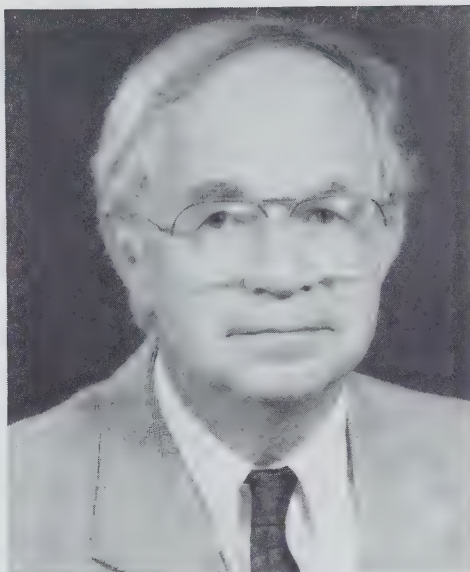
Journal: One last question: What would be your best advice for Dr. Roger Ellis, your successor?

Pownall: Good question. Accessibility is very important. Dentists should feel very comfortable communicating with the RCDS. Over the years, I've tried to impress this on students as well. Try to solve problems before they happen. I would never want the RCDS — or any other licensing body — to be looked upon as being unapproachable or some kind of policeman. We do have a role to play in prevention and having the dentist feel comfortable with us is very, very important.

Royal College (Canada) announces new officers



Dr. Richard G. Stapleford



Dr. Donald W. Lewis



Dr. Fredrick I. Muroff

The Royal College of Dentists of Canada has announced the results of a recent election, and two officer appointments: **Dr. Richard G. Stapleford**, was elected by acclamation to represent the Oral and Maxillofacial Surgery (OMFS) section on the Council of the College; **Dr. Fredrick I. Muroff** was appointed Chief Examiner in Periodontics, and **Dr. Donald W. Lewis** was appointed Chairman of the College's Credentials Committee. Initial terms of office for all three are for three years, renewable once.

Dr. Stapleford replaces **Dr. Guy Maranda** as the OMFS representative – **Dr. Maranda** was elected Vice-President of the College at its 1989 annual meeting. **Dr. Stapleford** earned his DDS degree in 1973 at the University of Western Ontario and completed his OMFS residency program at the Henry Ford Hospital, Detroit, in 1978. From 1978-81 he was on the staff of the Department of Surgery at that same hospital, and in 1989 he moved to Windsor where he has a private practice and acts as Chief of OMFS at the Hotel Dieu Hospital. He also acts as an associate clinical professor in the orthognathic surgery clinic at the University of Detroit. **Dr. Stapleford** became a Fellow of the RCDC in 1982, and has been a frequent examiner for the College. He also holds the Diploma of the American Board of OMFS.

Dr. Muroff obtained his DDS degree at the University of Detroit and certificates in both Periodontics and Endodontics at Boston University. He was admitted as a Fellow of the RCDC in 1969 and has a practice in Montreal. **Dr. Muroff** holds teaching positions in Periodontics at both McGill University as assistant professor and the Université de Montréal as a clinical instructor; he is on the staff as clinical assistant at the Montreal General Hospital and a consultant in Periodontics at the Montreal Children's Hospital. He has held many voluntary positions with local and national dental associations, including three years on the Council of the RCDC, and he has been a regular member of the College's examining team in Periodontics.

Dr. Lewis has been a Fellow of the

College in Dental Public Health since 1976, after having first obtained his DDS (1959), DDPH (1962) and MScD in Epidemiology and Biometrics (1965), all at the University of Toronto. He has been Professor and Chairman of the Department of Community Dentistry at that University since 1971, and Co-Director of Dental Health Services and the Epidemiology Unit there since 1973.

Besides epidemiology, his research interests are dental resource planning, biocompatibility of dental materials in practice, and dental care services. He has served in many research consultancies and positions in Canada and the U.S., Cuba, the Bahamas and the World Health Organization, and has published at least 53 journal manuscripts and 30 research reports.

Confused?

Several of the Spring issues of the Journal had loose inserts with a message "As a non-member, we know you will enjoy this complimentary copy of the Journal". This insert **inadvertently** was mailed to **every** dentist in Canada, not just the **non-members** in Ontario and Quebec.

In the two larger provinces, Ontario and Quebec, membership in CDA is voluntary (a provincial statute **not** a dental association wish) and the insert was part of the CDA Spring membership drive.

Dr. Arthur W.S. Wood

National honors awarded for dedication to protection from sports injuries

Arthur W.S. Wood, DDS, Dip. Paedo, FRCD(C), the Islington Ontario Paedodontist who has devoted 38 years to the development, production and testing of protective devices for young athletes in Canada was accorded high national recognition recently at a ceremony on Parliament Hill, in Ottawa.

He received a Canada Volunteer Award Medal and Certificate of Honour, conferred by the Hon. Gerald Merrithew, Minister of Veterans' Affairs, acting for the Hon. Perrin Beatty, Minister of Health and Welfare.

The Award was established by the national Health and Welfare department "to recognize and encourage those Canadians who have made outstanding voluntary contributions toward improving the health and social well-being of their fellow citizens", the Hon. Merrithew explained.

Citation for honor

The citation for the honor, read prior to the presentation, was as follows:

"Dr. Wood, internationally renowned for his untiring efforts to develop, produce and test protective devices for young athletes, has been nominated by the Canadian Dental Association. He also served as President of the Canadian Society for Dentistry for Children and the Canadian Academy of Pedodontics. His dedication in the field of sports dentistry has long been known and respected by his colleagues and his pioneering efforts have had a profound influence on promoting accident free hockey and other sports."

Dr. Bernard Dolansky, a member of CDA's Executive Council and incoming Vice-President was on hand to offer the congratulations of CDA to Dr. Wood.

"Great national resource"

Dr. Wood who has gained international distinction for his work in the sports dentistry and protection field is currently serving as President of the Academy of Sports Dentistry, an international body of which Dr. Wood was a founding member.

An American colleague who was high in his praise of Dr. Wood's role in the development of the mouthguard told a



Dr. Wood, right, proudly shows his Certificate of Honor to Dr. Bernard Dolansky, following the presentation in the West Block of the Parliament Buildings in Ottawa. Dr. Dolansky, a member of CDA's Executive Council and incoming Vice-President, represented the CDA at the ceremony and offered his congratulations.



Dr. Arthur Wood, left, is seen with the Hon. Gerald Merrithew, Minister of Veterans' Affairs after the Minister had awarded the Canada Volunteer Medal. Mr. Merrithew made the presentation in the stead of the Hon. Perrin Beatty, Minister of Health and Welfare, who was unable to attend.

Sports Dentistry Symposium in Toronto, that Canada should be proud of him – "he is a great national resource"

CDA spokesman to CSA

Since 1970, Dr. Wood has been Cana-

dian dentistry's spokesman as a member of the Canadian Standards Association's Technical Committee for Evaluation of Protective Equipment for Athletes. The committee was formed that year, and Dr. Wood, continues to serve.

That committee was formed largely because of Dr. Wood's criticism of the quality, or lack of it, in sports protective equipment then on the market.

Began crusade in 1952

Long before the committee was formed, Dr. Wood began his personal mission, when as the coach of a team of youngsters in a Toronto Metro area minor hockey league, he was appalled at the frequency of head and mouth injuries suffered each season.

Not one to let someone else solve the problem, Dr. Wood accepted the challenge personally. The basement of Dr. Wood's home became the research and development centre, where he, with a colleague who was an engineer and researcher at York University, studied the nature of sports hazards. They designed and actually made, protective devices for the head and mouth

regions. They then tested the devices under actual game conditions. In recognition for his devotion to his cause, Dr. Wood was named a member of the Mississauga, Ont., Hockey Hall of Fame.

His most notable achievement of international significance, was his substantial role in the development of a head form, in the exact proportions of the head of an average 10-year-old boy. Dr. Wood and his colleagues have been praised by colleagues concerned with protective equipment in many countries, because the model, for the first time, permits technically effective testing of sports protection equipment.

High CDA honor

Dr. Wood was accorded a high honor from the Canadian Dental Association at the 1985 CDA Convention – the Distinguished Service Award.

A graduate of the University of Toronto dental school in 1943, Dr. Wood has conducted a private practice in Islington, Ontario, near Toronto. Early in his career because of a personal interest in minor hockey, he became concerned about the incidence of facial and dental injuries, devoted much of his personal time to developing effective protective gear.

Prominent paedodontist

A prominent member of his own special field, paedodontics, Dr. Wood has served as president of the Canadian Society of Dentistry for Children and the Canadian Academy of Paedodontics. He is a founding member of the Academy of Sports Dentistry, and a member of that international body's executive council.

He is a familiar figure at symposia and as a speaker on the subject of sports dentistry.

Canadian Fellowship fund established in memory of Dr. Thomas M. Curry



Dr. Thomas M. Curry

The Canadian Fund for Dental Education has established a Fellowship Fund in memory of Dr. Tom Curry, prominent Alberta public health dentist who died recently.

This Fellowship is to assist in supporting a Dentist to take a postgraduate or graduate program in Dental Public Health.

The recipient must have confirmation of employment with a Government, other Health Agency, or a University.

The Fellowship would be awarded by the Board of Trustees of the Canadian Fund for Dental Education on recommendations by its Advisory Committee.

Anyone interested in making a donation of any amount to this Fellowship, should send a cheque to the Canadian Fund for Dental Education;

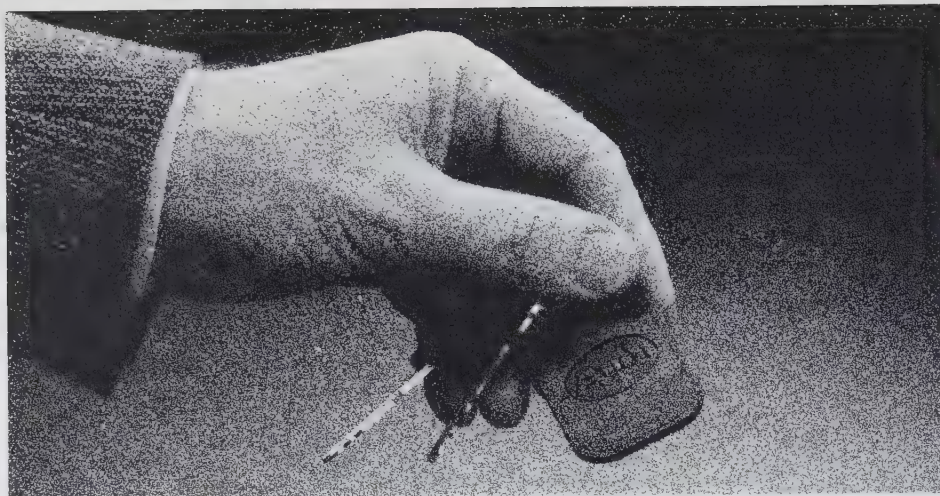
Canadian Fund for Dental Education
1815 Alta Vista Drive
Ottawa, Ontario
K1G 3Y6

and indicate that this donation is for the Dr. Thomas M. Curry Memorial Fellowship.

The Canadian Fund for Dental Education recognizes individual donors in its annual report which is published in the Journal of the Canadian Dental Association. Recognition is given under the following categories:

- Honourary Mention500 & Up
- Patron\$250 – \$499
- Honourary Member\$150 – \$249
- Member\$50 – \$149
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A tax receipt will be issued by the Canadian Fund for Dental Education.



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*Come and see us at our booth #605
at the CDA Convention in Ottawa*

The Ultimate Smile Dental Aesthetics Gives Cupid A Nudge

P. Ralph Crawford, BA, DMD

Sol Weiss is quick to point out that matchmaking wasn't his objective when he set out to practice aesthetic dentistry. Rather, it was a love of that fascinating branch that prompted him to customize his practice accordingly — and, move it from Winnipeg to Toronto. That move in itself is remarkable; everyone knows that downtown Toronto isn't the easiest place in Canada to begin a new practice. But challenge and innovation seem to be Dr. Weiss' hallmarks. Immediately after graduation in 1982, he initiated a unique type of practice at the Fort Garry Campus Clinic of the University of Manitoba. He implemented a three-pronged goal: full service dentistry, an emphasis on aesthetics, and a commitment to continuing education.

To this day, 10 per cent of Dr. Weiss' time is spent pursuing continuing education. Certificates from the American Academy of Cosmetic Dentistry, the Academy of General Dentistry, and the United States Dental Institute are displayed in his Toronto office. "It takes effort, energy, and extra courses to become proficient," says Weiss.

Why leave a secure practice in Winnipeg for an uncertain one in Toronto? "I was convinced that cosmetics would be a major part of the dentistry in the '90s and to me, Toronto was more of a trendsetting city." A little patience, a little risk-taking, and he says, "a little marketing" doesn't hurt. The ambiance of his office, including the decor and patient literature, certainly bespeak a dentist interested in the aesthetics of dentistry. With larger-scale marketing in mind, he has also presented the imaging aspect of dentistry to Toronto TV viewers.

How busy is this enterprising young man; "Never as busy as I want to be, but I see five to 10 patients a day. I only have two operatories and no hygienist, so I have to do all the treatment myself. I'm booked every day this



The video imaging system instantly shows Lindy how porcelain veneer bonding creates a "new you".

week and I can't do better than that."

A profile of Sol Weiss' typical aesthetics patient would produce a bifocal "image": "One is the up-and-coming younger set, about 65 to 70 per cent female, seeking that aesthetic smile. The other is people with previous dentistry that was rendered on an 'as needs' basis. The treatment was good,

but all different; there is no continuity. One of the worst things I see is good work that doesn't match, that doesn't fit in. People today are concerned with looking good and feeling good."

One last comment. No visit to the Weiss office would be complete without mentioning his staff's enthusiasm and commitment. Their automatic references



Dr. Weiss demonstrates Exan's Spectrum System to the Journal Editor... ("Sorry, only a miracle will help!").

to "our" office — not "the" office — reveal a great deal about the level of dedication they bring to their daily workplace. "There is no place for boredom here," says Dr. Weiss, who has very consciously promoted this attitude. "Office atmosphere is critical; it is important to have an enthusiastic staff."

Lindy's love story is proof that, in dentistry, purpose, perfection, and dedication to patients are still the right combination of ingredients to end the story — "they all lived happily ever after."

"We have the technology!" doesn't usually evoke romantic scenarios that conclude with wedding bells. But for Lindy, that is exactly where the aesthetics performed by Toronto dentist Dr. Sol Weiss led.

An attractive young woman, Lindy had always been unhappy with her smile. The laterals of her anterior teeth were peg-shaped, rotated, and proclined. Like many silent sufferers, she smiled infrequently, and when she did smile, a hand instinctively covered her mouth. Other dentists had advised appropriate treatment, but until her consultation with Dr. Weiss in August of '89, Lindy took no action. Dr. Weiss, a 1982 University of Manitoba graduate, is a young, single-minded dentist with a strong sense of purpose: "I was determined to maintain a full-service aesthetic office."

Full service is just what Lindy encountered when she made her way to the two-operatory, second-floor office in the heart of downtown Toronto. A warm, friendly staff greeted her and made her comfortable during a thorough dental examination. Total care and concern for patients' well-being is the underlying principle of Dr. Weiss' office, a principle shared and practised by each of his staff members.

Dr. Weiss introduced Lindy to the scanning capabilities of his recently purchased Exan Spectrum Imaging System. Her reaction was immediate, highly emotional, and moving to watch. Receptionist Lori Morrison recalled the poignancy of the moment: "We could all sense what emotions were welling in Lindy. It was very moving."

After this strikingly visual demonstration, Dr. Weiss explained what porcelain veneer bonding entailed, describ-



Dr. Sol Weiss and dedicated staff. Left to right: Debbie Downham, Shirley Snokowitz, Lori Morrison.

ing the procedure and emphasizing the patient's role in ensuring its success. Needless to say, Lindy accepted the treatment proposal. Lindy's eight porcelain veneers were completed over a period of three weeks with the major treatment involving the laterals.

Enter Romance

It is now the fall of 1989; Lindy has a new smile, a new image, a new feeling about herself. The love story unfolds. At a cocktail party, she meets a young man who compliments her on her attractive smile. They begin to date, fall in love, and before long, a Boston wedding is planned. Others may

doubt the role aesthetic dentistry played in this fairy tale romance, but Lindy herself was quick to recognize its contribution to her newfound happiness. To Dr. Weiss and his staff, she wrote:

"You were all great to me. I'm so glad that I can share this satisfaction with such great people. I love the new me. Thank you."

Not only did the treatment enhance her appearance, but it also gave her a self confidence that she had clearly been lacking. Her message of gratitude also included wedding invitations to Dr. Weiss et al. Never let it be said that dentistry isn't great and love isn't grand! (Just ask Lindy!)



Before



After

"You were all great to me. I'm so glad that I could share this satisfaction with such great people. I love the new me. Thank you."

In Moncton, N.B.

CDA Governor addresses first AGD convention

CDA Governor Dr. Ray Wenn, of Charlottetown, was a major speaker at the first annual convention of the Atlantic Canada chapter of the Academy of General Dentistry, held in Moncton, New Brunswick.

'The AIDS Dilemma'

Dr. Wenn delivered the keynote lecture on "The AIDS Dilemma." "Every dentist in the country," he said, "should be willing to treat AIDS-afflicted Persons, instead of expecting a few to shoulder the whole load".

He pointed out that as long as dentists adhere to the universal precautionary steps, there is no danger of contraction of the disease from a patient or that the malady would be spread between patients. Dr. Wenn said the same applies to all infectious diseases one might encounter among dental patients.

He emphasized that the Canadian Dental Association had developed and approved infection control guidelines for dentists practising in Canada, and also a code of ethics emphasizing obligations to treat afflicted patients.



Dr. Ray Wenn, Seen during his presentation on "The AIDS Dilemma"

Regarding his home province of Prince Edward Island, Dr. Wenn said there is no "short list" of dentists who will accept and treat AIDS patients there. "Every dentist will do it.

"If I were the only dentist on Prince Edward Island saying this, I would have been shot down in flames by now," he said. Because of this unanimity, Dr. Wenn explained, the general public in PEI have been assured they

have nothing to fear in going to their dentists' offices.

Officers named

Atlantic region AGD officers were named during the convention. The President is Dr. John Robertson of Summerside, PEI, a Past-President of the CDA, and the Past-President and Newsletter Editor is Dr. Stephen O'Brien, of Moncton, New Brunswick. Dr. Roland Gaudet, also of Moncton, is the Secretary-Treasurer and Continuing Education Planner.

Obituaries/Nécrologie

BROWN, Irving S. Dr. Brown, a native of Tribune, Saskatchewan, was a graduate of the University of Toronto dental school in 1950. He practised in Scarborough, Ont.

CAMPBELL, H. R. Born in 1920, Dr. Campbell graduated in dentistry from the University of Toronto in 1952. He practised in Kingston, Ont. He was a Life Member of the Canadian Dental Association.

DENIGER, Albert. Dr. Deniger was a graduate of the University of Montreal's School of Dental Medicine in 1922. He conducted a practice in Montreal.

LANG, Leon. A graduate of the McGill University dental school in 1938, Dr. Lang was a Life Member of the Canadian Dental Association. He practised dentistry in Montreal.

MISENER, Howard B. Dr. Misener, a graduate of the Faculty of Dentistry, University of Toronto, in 1965, conducted a practice in dentistry in Guelph, Ontario.

NEWBY, Jack D. Dr. Newby was a graduate in dentistry from McGill University, Montreal, in 1954. He practised dentistry in Prince George, British Columbia.

ROSEN, Samuel. Dr. Rosen, who was a native of Romania, graduated in dentistry from the University of Toronto, in 1927. He practised dentistry in Hamilton, Ont. Dr. Rosen was in his 90th year.



AGD executive members posed for this group photograph during the convention. They are, from the left: Dr. Stephen O'Brien, Past-President and Editor; Dr. Roland Gaudet, Secretary-Treasurer and Continuing Education Planner; the President, Dr. John Robertson and Dr. Michael Taylor, Continuing Education Chairman.

Dr. George E. Burgman to become President of international group

George E. Burgman, DDS, of Niagara Falls, Ontario, who is a Past President (1986) of the Canadian Society of Forensic Science, will be installed as President of the American Society of Forensic Odontology (ASFO) at the annual meeting in Anaheim, California, in February, 1991.

He is one of the 11 Canadian members of the 460-member ASFO and was appointed to the international body's Board of Governors two years ago.

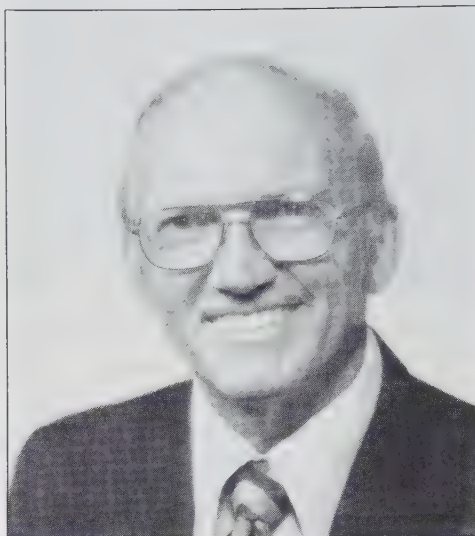
The ASFO is a separate entity from the Odontology Section, American Academy of Forensic Sciences (AAFS), allowing it to pursue its own aims and objectives pertaining to forensic odontology. The AAFS comprises a number of forensic disciplines, not just forensic odontology.

The Canadian Society

The Canadian Society of Forensic Science is the same type of organization, and is composed of eight forensic disciplines: Biology, Chemistry, Counterfeit Identification, Documents, Engineering, Medical, Odontology and Toxicology.

In Canada in the early 1970s there was an organization called The Canadian Society of Forensic Odontology (CFSO). Because the membership was small – just over 60 – the Society chose to join the Canadian Society of Forensic Science and became its Odontology Section.

The original CFSO was formed by and through the efforts of Drs. Ken Pownall (recently retired as Registrar of Ontario's Royal College) and James Purves. Two weeks later, Dr. Burgman recalls, a major aircraft crash near Toronto – with a loss of 109 lives – resulted in the group contributing greatly in the identification of the victims through dental means.



George E. Burgman, DDS

Since 1845 in Canada

Forensic science in Canada can be traced back to as early as 1845 when forensic medicine was a subject in the curriculum of McGill University's Medical School in Montreal. In 1914, Montreal was also the location of the first forensic laboratory in North America, established under legislative authority.

In the first treatise on forensic medicine which appeared in 1920, were references to identification by dental means as well as information concerning bite mark evidence.

The first major use of dental identification in a mass disaster came about in September, 1949 when the S.S.

Noronic, the flagship of the Canada Steamship Lines, berthed at a pier in Toronto harbor with 700 passengers on board, suddenly erupted in flame. The next day it was discovered that 118 had lost their lives. (Dr. Robert Dorion made reference to this incident in his July article in this Journal – "Disasters Big and Small.")

Forty-one dentists took part in this identification process. One was Dr. Edgar A. White, who, with two other

dentists wrote an article on the disaster. Their recommendations concerning identification in mass disasters are still valid today. They particularly noted the appalling failure on the part of some dentists to make and maintain accurate records of their patients.

In January of 1950, an article appeared in this Journal (JFDA) on mass disaster identification (dental). It established many of the procedures followed today.

Education

All 10 dental schools in Canada conduct courses of various lengths in forensic odontology in the undergraduate curriculum, however no school has any full-time faculty member devoted primarily to this subject.

Members of the Odontology Section of the CSFS are asked regularly to lecture to police academies and undergraduate dental classes across Canada. They are also requested to give lectures at dental meetings and conventions.

First involved in 1969

Dr. Burgman told the Journal he first became involved in forensic dentistry in 1969 when an identification of a decomposed body was required for a coroner. He had asked several other Niagara Falls area dentists who declined the invitation to do a dental/oral examination. Dr. Burgman accepted and said it led to a continuing interest in the science.

A DDS graduate of the University of Toronto in 1949, Dr. Burgman was the winner of the Academy of Dentistry prize in Paedodontics.

Province of Ontario official

He is currently serving as Coordinator of a Province of Ontario Dental Identification Team for Mass Disasters. The team is composed of four prominent and experienced forensic odontologists.

Practice Management Advisor

Donald L. Winget dies in Edmonton at age of 57



Donald L. Winget

Donald L. Winget, widely known within the dental community in Canada, died recently in Edmonton at the age of 57.

His interest in the practice management needs in dental offices brought him into personal contact with a wide circle of dentists across Canada.

Mr. Winget had been totally involved in serving dental professionals since 1964, when he started with the Medi-Dent Service in Western Canada. He held a number of different positions with Medi-Dent at various locations in Canada prior to establishing D/M Office Systems in 1976.

He continued to develop D/M office systems and in 1987, set up another enterprise, Professional Practice Builders Inc. Mr. Winget remained as President of both companies, to service Alberta and Saskatchewan.

Lectured to dental students

In addition to operating his businesses, Mr. Winget spent several years lectur-

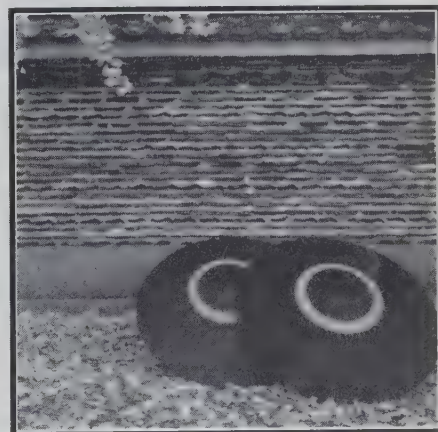
ing to graduating classes in dentistry at the Universities of Alberta and Saskatchewan, and also to hygiene students at the University of Alberta. Students and clients alike were impressed by his sincerity and integrity.

Memorial fund established

As a tribute to his keen personal interest in practice management, a memorial fund has been established by friends in the dental industry, in order to continue lectures on the subject at the Universities of Alberta and Saskatchewan.

This fund will be administered by the Canadian Fund for Dental Education, 1815 Alta Vista Drive, Ottawa, Ontario, K1G 3Y6. Donations may be sent directly to CFDE with a notation designating it for the special memorial fund.

13TH CONGRESS



INTERNATIONAL
ASSOCIATION OF
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FOR CHILDREN

KYOTO-JAPAN

SEPTEMBER 27-30, 1991

CDA Retirement Savings Plan

Unit values: (Funds are valued weekly)

Fund

Bond & Mortgage Fund
Common Stock Fund
Money Market Fund
Balanced Fund

Unit values as at	
June 30, 1990	May 31, 1990
72.38529	71.44886
16.08219	16.16215
50.59004	50.08255
29.73202	29.54419

G.I.C. Fund

Term

1 yr
2 yr
3 yr
4 yr
5 yr

*Interest rates as at	
June 30, 1990	May 31, 1990
12.85%	12.85%
12.55%	12.55%
12.30%	12.40%
12.10%	12.25%
12.10%	12.25%

(*rates subject to change without notice.)

Total Assets (Market value) of the Plan as of:

June 30, 1990	May 31, 1990
\$123,436,029.98	\$123,387,782.65

For further information:



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Willowdale, Ontario
M2J 4Z3

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Dr. Ernest Ambrose appointed to CFDE Advisory Committee



Dr. Ernest R. Ambrose

Dr. Ted Ramage, CFDE Chairman, recently announced the appointment of Dr. Ernest R. Ambrose to the CFDE Advisory Committee on Fellowship Selection. Dr. Ambrose brings many years of service and professional acumen to the Committee.

After receiving his dental degree from McGill University in 1950, Dr. Ambrose served within the dental faculty of McGill in an array of distinctive positions, the latter seven years as Dean.

In 1977, Dr. Ambrose was appointed Dean of the Dental Faculty at the University of Saskatchewan, where he served for eight years, and has been a professor in Restorative Dentistry from 1977 to the present.

An active member of many national, provincial and international dental organizations, Dr. Ambrose has served on many councils and committees, among these are the CDA Council on Education and the DAT Committee; representative of the Council on Education, Clinical Examiner and Chairman of the Written Examiners of the NDEB. Throughout the years, Dr. Ambrose has also served on many university committees and held hospital appointments in Montreal and Saskatchewan.

Dr. Ambrose replaces Dr. Wesley J. Dunn, of London, Ontario, who served with distinction on the CFDE Advisory Committee for the past five years, the latter four as Chairman.

Meet the CDA Headquarters Staff CDA PROFESSIONAL SERVICES DEPARTMENT



The CDA Professional Services Department, under **Brian Henderson** (standing right), Director of Education and Accreditation and Professional Services, has two main sections, the Education and Accreditation section and the Professional Services Section. In an earlier group photo in this Journal, department members working in education and accreditation, were featured. Mr. Henderson and **Susan Matheson** (seated, at desk), Associate Director of Education and Accreditation, also work with committees on the Professional Services side of the operation. Mr. Henderson provides senior staff support to the Committee on Consumer Product Recognition, the Committee on Dental Materials and Devices and the Committee on Community and Institutional Dentistry. **Danuta Askew** (standing extreme left) works closely with him as coordinator of the latter two committees. Susan Matheson provides senior staff support to the Committee on Third Party Dental Plans and its sub-committee on Electronic Data Interchange (EDI). **Patricia Duminy** (standing, second from right) works closely with Susan as coordinator of the Dialogue in Dentistry program, a CDA service offering information to employers on the advantages of direct reimbursement plans, as distinct from other forms of dental coverage. **Laura Malo** (inset, upper right), recently replaced **Angela Weatherall** (second from left, standing), in providing secretarial and clerical support, principally in relation to activities of the Third Party Committee, as well as Education and Accreditation.



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1990/91 CFDE Award Recipients Announced



The Canadian Fund for Dental Education announced in May the recipients of its 1990 grants and 1990-91 Teacher/Researcher Fellowship Awards.

Among the recipients of the \$230,923 in grants are: each of the 10 dental schools, with allocations for unrestricted grants of \$1,500 and undergraduate grants of \$2,000; the 1990 ACFD Deans' and Faculty Development Institutes which took place this February in Barrie, Ontario, received a \$42,000 grant; \$10,000 has been allocated to the 1990 CDA Teaching Conference on "Nutrition in Dentistry"; the CDA Students' Conference and Dental Students' Table Clinics will be supported again with grants of \$11,000 and \$10,000 respectively.

A total of \$45,000 has been allocated for programs to increase public demand for dental health care. In addition, CFDE has granted up to \$10,000 for the CDA Dental Health Month Program. The income from the Lorne E. MacLachlan Endowment Fund of \$15,723 will again be divided equally among the dental faculties at Toronto, Western Ontario, McGill and Dalhousie to benefit their prosthodontics departments.

The Murray McDonald Memorial Lecture, to be held in August at the CDA Convention in Ottawa, will again be sponsored, this year in commemoration of CFDE's former Executive Director. TV commentator Mike Duffy is this year's featured speaker. CFDE has allo-

cated \$10,000 towards the printing of "Dentistry Faces Addiction", in the CDA Journal. The CDAA and RCDC will each receive support of \$5,000 for their Dental Assisting Examination and Examiners' Workshop respectively. A total of \$26,000 was allocated for teacher/researcher training fellowships.

The CFDE is dentistry's only national, not-for-profit fundraising agency and is committed to invest its resources exclusively in programs that offer the greatest benefits to the profession and the public.

The Fund's programs are made possible by voluntary contributions from dental industry, the profession, dental organizations and dental auxiliaries.

CFDE 1990-91 Fellowship Award Recipients

CFDE Fellowship for a University Dental Teacher Sponsored by:

Warner Lambert Canada Inc.

Dr. Gary Bruce Gibson (\$2,500)
University of British Columbia
To participate in
U. of Washington
DECOD Program
(dental education
in care of the disabled).

Dr. Guy Boyer (\$2,500)
University of Montréal
To undertake clinical and
applied research using
laser technology.

CFDE Fellowship for a University or Community College Dental Hygiene Teacher Sponsored by:

Warner Lambert Canada Inc.

Professor Ellen Brownstone (\$2,500)
Manitoba School of Hygiene
To assist Prof. Brownstone in
launching her program in
higher education studies.

CFDE Teacher/Researcher Training Fellowships Fellowship Grant Renewals

Dr. Salam Sakkal (\$2,500)
University of Montréal
To continue his studies at Loyola
University in Endodontics and Oral
Biology.

Dr. Benoît Lalonde (\$3,500)
University of Montréal
To continue his studies at
U. of Washington in Oral
Medicine.

New Teacher/Researcher Training Fellowships

Dr. Corrine H. Machnee (\$2,000)
University of Saskatchewan
To assist in her chosen area of
study combined removable and
fixed prosthodontics.

Dr. Larry Edward Peacock (\$2,000)
Dalhousie University
For his study program
involving a thesis project
in Endodontics.

Dr. Victor Edmond Wagner (\$1,500)
University of Western Ontario
For his program towards Certificate
and Master of Science degree in
the clinical specialty of Endodontics.

Dr. Albert Jeffrey Coil (\$2,000)
University of B.C.
For the final year of his PhD program,
specializing in Endodontics.

Ms. Salme E. Lavigne (Hygienist) (\$2,000)
Confederation College
As "seed money for her one-year
program pursuing a Master of Science
in dental hygiene education.

Ms. Charla Joyce Lautar (\$2,000)
John Abbott College and
McGill University, for her study
program toward a PhD in education,
combining dental hygiene, computers
and education

Henry M. Thornton Fellowship sponsored by Dentsply International For the most deserving new applicant

Dr. Corrine H. Machnee (\$1,000)

CDSPI Reports



How to Select an Insurance Agent or Broker

The selection of an insurance agent or broker is one of the most important decisions you will make when buying life insurance. Your insurance coverage is too important a part of your overall financial plan to be placed in the hands of someone who leaves you with doubts and misgivings.

If you are considering buying some life or disability insurance through an agent/broker, you will want to select this person very carefully. You should interview the agent/broker as he/she will interview **you** and make your selection as you would of any professional person. You are likely to pay them a lot of premium dollars and should expect the best possible service.

Here are a few suggestions for choosing an agent or broker:

1. Experience — Look for someone with a minimum of two years experience dealing with the professional market. If they don't volunteer the information, ask them how long they have been selling insurance and specifically, check their experience in dealing with dentists.

2. Training — An agent or broker with a CLU designation has several years experience and thorough training. Earning that CLU designation requires dedication and a career commitment — a good sign they'll be around to serve you in the future. What ongoing training has the agent/broker had? For example, has the agent/broker passed the Life Underwriters Association training course?

3. Agent or broker — All agents/brokers require a life insurance company to sponsor their licence. A career agent sells only his/her sponsoring company's products. Independent brokers have contractual agreements to sell the products of several companies. Each may be appropriate for some people and circumstances, but always be aware of whether you are dealing with an agent or a broker.

4. Referrals — Ask the agent/broker for any referrals they may have from other dentists and check them out.

5. Sales volume — Many agents/brokers feel you should be impressed because they are members of the elite "Million Dollar Club." Be more concerned about how well they have **served** their clients, not how much they have **sold** them.

6. Conflict of interest — Never lose sight of the fact that an agent/broker makes commissions relative to the type and amount of the insurance he or she sells. A good agent/broker knows that long term success is best achieved by selling you only the insurance you need. If you have any doubts about the agent/broker and a possible conflict of interest, they are not the person for you.

7. Knowledge of CDIP — Some agent/brokers will criticize the Canadian Dentists Insurance Program, claiming it is inferior. In trying to compete with the program, they make incorrect statements about the features and benefits of CDIP coverage. Beware of these peo-

ple — they are misinformed and may be misleading you out of ignorance of the program. Ask your prospective agent/broker if he or she is on the CDIP mailing list to receive information. If they are not, urge them to contact Canadian Dental Service Plans Inc.(CDSPI). We will be pleased to provide them with the facts about CDIP.

A good agent/broker should be knowledgeable about CDIP and how you can combine your CDIP and private coverage for maximum value and protection. They realize that it is often in their dentists-clients' best interest to insure with CDIP or to combine CDIP with some private coverage. When we receive a call from an agent/broker we will co-operate fully by providing a CDIP Program Information brochure. Only if the agent/broker submits a written authorization from you will we release information on your CDIP coverage.

8. Remember — Your own CDIP is capable of handling most of your life and disability insurance needs. There may be times, however, when you may wish to deal with an agent/broker in addition to CDIP.

If you are not satisfied with the agent/broker's presentation, competence, professionalism and proposed solution to your needs, you are under no obligation to buy. If you are, sign the application form.

Keep the above points in mind and most important of all — maintain control. Make informed decisions without succumbing to excessive sales pressure. That way, everyone comes out a winner!

Remember too, CDSPI's free Insurance Review Service will examine any private policy or proposal and provide you with an objective, informative written report.

For more information, call CDSPI — **your** service organization.

CDSPI

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The DAP Advisor

The DAP Advisor offers information, ideas and advice to improve dentist/patient communication, raise awareness about good dental health, and help your practice become busier.

Little Things Mean a Lot

As a caring professional, you go out of your way to ensure that your practice offers patients the best possible dental treatment. But what about the non-dental treatment they receive? How do you treat patients as people? Sometimes, it is the little things you do for patients – things they may not even be aware of – that make for a pleasant visit. Often patients will only notice if you don't do these things. Here, then, are a few of the little things you and your dental team can do – little in relation to the effort they require, but very large in terms of how they can loom in the patient's memory:

- **Remember the patient's name.** The first and most basic rule in ensuring patient satisfaction is making sure that everyone on the dental team – or at least, those who have contact with the patient – know the patient's name. But knowing is not enough; it is also vital to pronounce it correctly. If, for example, you refer to Mrs. Houghten (pronounced "Hutton") as Mrs. "Hufften", all your best efforts to build good will may have been for nought. You should therefore ensure that the patient's name is not only spelled correctly in her file but, if necessary, there is a note on – and dental team members are aware of – how to pronounce it.
- **Acknowledge the patient at the reception desk.** This applies to the receptionist, who greets patients when they arrive, and expedites their departure when treatment is concluded. It can also apply, however, to any dental team member who makes an appearance in the reception area while patients are waiting. For example, if the dentist comes up front to talk to the receptionist and happens to see and catch the eye of waiting patients, the dentist should acknowledge them. A smile, a nod of the head, a quick "hello" – that's about all that you have to do. Those few small gestures can go a long way towards making patients feel good about you and your practice.
- **Talk to patients in language they understand.** Most patients would have a hard time trying to figure out what you are talking about if you tell them they have "sub-gingival calculus". But tell them they have tartar under their gumline, and everything becomes crystal clear. So, as much as possible, communicate with patients in language they are likely to understand, explaining terms they are not familiar with, and encouraging them to ask questions about treatment, or any other aspect of dental health.
- **Talk to, not about the patient.** Sometimes, when the patient is sitting in the dental chair, dentists and their team members have a tendency to talk about the patient as if he/she were not there. You should be aware of this tendency and take steps to overcome it, for example, by making a point to address the patient throughout the procedure. That way, patients will not feel like just another warm body in your dental chair, and you will help put them at ease.
- **Inform before you perform.** From the patient's perspective, there is a rule of thumb when it comes to treatment: the fewer surprises the better. Patients who know what to expect from treatment are more likely to be prepared for what comes next. And the more prepared they are, the more treatment is likely to be a calmer, less threatening experience. Minimize the anxiety, tell patients what you are going to do before you do it.
- **Keep dental office business private.** These is a time and a place to discuss office business and neither are in the operator in front of patients. It is inappropriate to air office linens in public. More than that, it can be embarrassing, making patients privy to information that is none of their business, and put you and your practice in an unfavourable light. Office affairs should be discussed in private, away from the eyes and ears of everyone it does not concern.
- **Remember, no gossip is good gossip.** Patients are all ears when it comes to the sounds around them. When those sounds are of dental staff gossiping about other patients or team members, patients may get the idea that, once treatment is over, they will become the next item on the gossip hit-list. That is an alarming thought for an unsuspecting person who just came in for a semi-annual teeth cleaning. In the future, he/she may decide to have their teeth attended to in a dental office where gossip does not flow so freely.

Callout: Sometimes, it is the little things you do for patients – things they may not even be aware of – that make for a pleasant visit.

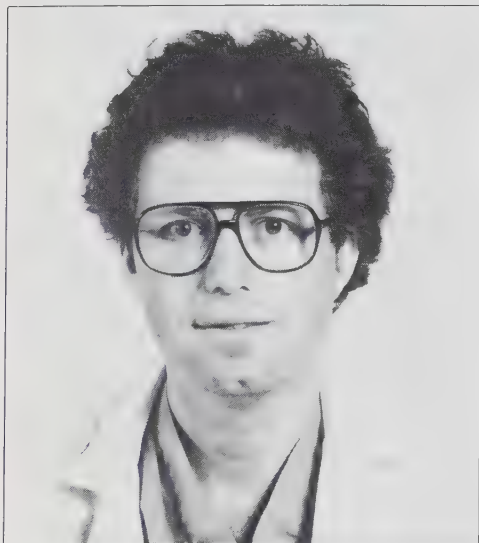


Oral and Maxillofacial Surgeon
George K.B. Sandor, MD, DDS, FRCD(c), of Toronto, has been appointed Consulting Editor in Medicine of this Journal.

An associate in a private Oral and Maxillofacial Surgery practice in Toronto, Dr. Sandor is also a Research Associate, Surgical Coordinator, Osseointegration Unit, Department of Prosthodontics, Faculty of Dentistry, University of Toronto.

Presently he is enrolled in a 48-month program as a resident in plastic surgery, Division of Plastic Surgery, Department of Surgery, University of Toronto (Toronto General Hospital).

Recently, Dr. Sandor received the Toronto General Hospital's Annual Award for Teaching Excellence in Medical Education.



George K.B. Sandor, MD, DDS, FRCD(c)

DDS from University of Toronto

He received his DDS degree from the University of Toronto in 1978, and his credentials in the specialty of Oral and Maxillofacial Surgery from the University of Washington, Seattle.

In 1986, Dr. Sandor was graduated as a Doctor of Medicine by the University of Toronto.

He consistently attained high honors and won prestigious scholarships and awards throughout his student years.

Dr. Sandor has contributed extensively to the dental literature and several of his papers have been published in the Journal of the Canadian Dental Association.

He has conducted courses and given presentations throughout Canada and the United States and also in Europe and Australia.

Dr. Sandor organized a missionary dental trip to Haiti for six dental graduates in the spring of 1978, working at four different clinics, doing primary exodontia and simple restorative work.

In the previous summer, he was a member of a medical group mission to the Dominican Republic, working at various village clinics, performing emergency exodontia. △

The Canadian Dental Association's 1990 Teaching Conference is scheduled for October 19, 20 in Toronto, Ontario.

Two experienced educators in the field of nutrition and dentistry will be the keynote speakers and workshop leaders — Mary P. Faine, MS, RD, from the Prosthetics Department, School of Dentistry, University of Washington, Seattle, and Athena Papas, DMD, PhD, Co-Director of the Division of Geriatric Dentistry at Tufts University School of Dental Medicine, Boston.

All dental educators, nutritionists and dental professionals are encouraged to attend the Conference and participate. The event is generously funded by the Canadian Fund for Dental Education. The National Institute of Nutrition and the NutraSweet Company of Canada are providing additional support.

Further information may be obtained from the Conference Chairman, Nina E. Burgess, Preventive Department, Faculty of Dentistry, University of Toronto, 124 Edward Street, Toronto, M5G 1G6, telephone 1-416-979-4311, or FAX 1-416-979-4566. △

Dr. Marvin Werbitt has been elected President of the Alpha Omega-Mount Royal Dental Society for the 1990-91 term.

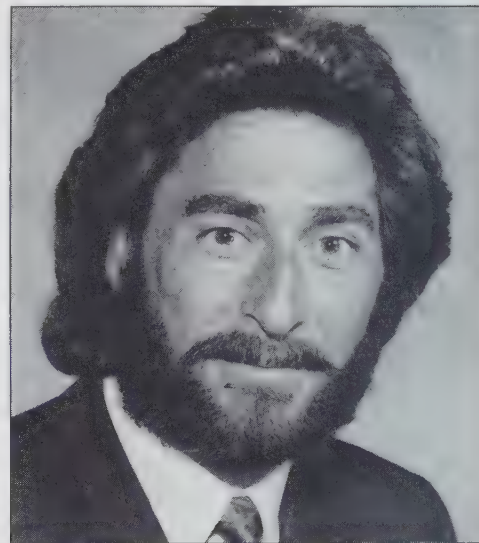
Dr. Werbitt, who received his DDS from McGill University in 1971 and a Masters degree in Periodontics from Boston University School of Graduate Dentistry in 1973, is presently Section Head of the Department of Periodontics at the Jewish General Hospital and Assistant Professor in the Faculty of Dentistry at McGill University.

He has been in private practice in Montreal for the past 17 years.

Other officers named at the recent general meeting of the Society are:

Vice-President — Dr. M. Schwartz;
 Immediate Past-President — Dr. S. Israelovitch; Treasurer — Dr. S.

Cymet; Corresponding Secretary — Dr. H.S. Katz; Recording Secretary — Dr. M. London; Associate Treasurer — Dr. W. Retter; Archivist, Alpha Omega — Dr. J. Tink, and Editor — Dr. J. Szwinmer. △



Dr. Marvin Werbitt

Some forms of advanced periodontal disease could be a reliable early indicator of AIDS, according to research being conducted at the University of Medicine and Dentistry of New-Jersey.

The study, which examines the signs and prevalence of periodontal disease among drug abusers who have AIDS, was reported in the March 1990 issue of *Dental Economics*.

The lead researcher, Dr. Patricia Murray, associate professor of periodontics at the dental school, conducted a periodontal disease study of gay AIDS patients last year at the University of California at San Francisco's dental school.

"We found we were treating a large portion of HIV-positive patients who had advanced periodontal disease," noted Dr. Murray. "We developed treatments to eliminate periodontal disease and the associated threat of infection, which could prove fatal to patients with damaged immune systems."

She said her study results showed the periodontal disease type the HIV-positive patients had differs from the periodontal disease usually seen in the general public. She characterized the periodontal disease of the HIV-positive study participants as progressing rapidly, with accompanying oral lesions.

— ADA "Update"

Dental Records

Les dossiers dentaires

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3. Cook, A.R. "Risk management and the TMJ disorder patient." *Functional Orthodontics*. Mar-Apr 1988; v.5(2), pp. 21, 24-6.
4. Dunn, W. "Patient records and the media." *Ontario Dentist*. Jul-Aug 1988; v.65(6), pp. 27-31.
5. Ebersold, L.A. "Periodontal malpractice: current standards and record keeping requirements." *Journal of the Michigan Dental Association*. Sept. 1989; v.71(9), pp. 483-6.
6. Elderton, R.J. "Keeping up-to-date with tooth notation." *British Dental Journal*. Jan 21, 1989; v.166(2), pp. 55-6.
7. Estey, A. "Protect yourself with the best defense: accurate recordkeeping." *CDS Review*. May 1988; v.81(4), pp. 41.
8. Filler, S.J. "The 'how-tos' of dental consult writing." *Dentistry*. Apr. 1988; v.8(2), pp. 18-20.
9. George, L.A. "Important patient contracts as part of legal records." *Journal of the Greater Houston District Dental Society*. Oct 1989; v.61(3), pp. 6-8.
10. Gilpin J.L. "New Approach to an old subject." *RDH* May 1988; v.8(4), pp. 30, 32.
11. Gosselin, C.E. "The use and transfer of patient records." *Journal Dentaire de Quebec*. Sept. 1989; v.26, pp. 472-3.
12. Graser, S.D. "Organizing records and equipment for transport to a laboratory." *Journal of Prosthetic Dentistry*. Jan. 1990; v.63(1), pp. 102-3.
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 16. McCarthy, F.M. "Documenting safe treatment of the medical-risk patient." *Journal of the American Dental Association*. Sept. 1989; v.119(3), pp. 383-9.
 17. Nasedkin, J.N. "TM joint reports: simplified computer format." *Cranio*. Jul 1988; v.6(3), pp. 271-8.
 18. Nelson, G.V. "Guidelines to the prevention of problems in record keeping." *Pediatric Dentistry*. Jun 1989; v.11(2), pp. 174-7.
 19. Pearson, A.V. "Communication and a heads-up philosophy can reduce your exposure to malpractice claims and help you serve your patients more completely." *Hawaii Dental Journal*. Jul. 1988; v.19(7), pp. 9-10.
 20. Rozavsky, L.E. "Beware the spoken word. The often forgotten dangers." *Oral Health*. Feb 1988; v.78(2), pp.39-40, 42.
 21. Scholz, R.P. "Computerized patient records — a potential risk." *American Journal of Orthodontics and Dentofacial Orthopedics*. Apr. 1989; v.95(4), pp. 42A, 44A.
 22. Scholz, R.P. "Indefinite storage of orthodontic records." *Journal of Clinical Orthodontics*. Nov. 1988; v.22(11), pp. 734-5.
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from a legal perspective: sources and guidelines for improvement." *Journal of Law and Ethics in Dentistry*. Oct-Dec. 1988; v.1(4), pp. 188-93.

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One copy of the above package of articles is available for \$5.00 to all CDA members and for \$10.00 to non-members. (Ontario residents, please include 8% sales tax.)

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Les membres de l'ADC peuvent obtenir pour 5\$ et les non membres pour 10\$ une copie des articles de la bibliographie ci-dessus.

Aux heures ordinaires:
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1-800-267-6364 (l'est du Canada, sauf la région dont le code est 709)

Programme informatique

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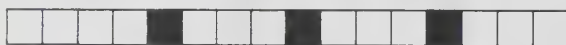
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MODERN CONCEPTS IN OPERATIVE DENTISTRY,

Edited by Preben Horsted-
Bindslev, Ivar A. Mjor

*1st edition, 1st printing,
Munksgaard, 1988,
Copenhagen,
1988, 339 pages,
B&W and colored illustrations.*

This textbook is presented as a transition between traditional teaching in operative dentistry and what it will become in future. The text is multi-authored and includes contributions by clinicians and researchers from both sides of the Atlantic. The aim of the publication is to provide up-to-date restorative concepts for consideration by students or clinicians. The word "Modern" has been included in the title to indicate this book is different from current operative dentistry texts. An appropriate and complete reference section concludes each chapter.

The first chapter is introduction and explains the authors' intentions.

In the second chapter, dental caries is discussed, and its various aspects, well-illustrated with microscopic sections. It is the authors' opinion, that the operator should have comprehensive and up-to-date knowledge of dental tissues, including their macroscopic anatomy, histology and ultrastructure with reaction potentials. This chapter presents these fundamentals accurately and in detail.

The third chapter deals with patient assessment and treatment planning in a practical manner with a strong emphasis on prevention, and is well-illustrated with excellent colored or black and white photographs.

The fourth chapter discusses the principles and types of cavity preparation for different materials. The clinical techniques and use of instruments are described rather superficially, and detailed step by step outlines of the different cavity preparations are not included. One comment about the excellent drawings is that the details of cavity preparations are not always accurate. The information about hand- and rotary cutting instruments is minimal and their applications and importance are only briefly mentioned.

In the fifth chapter cavity treatment

and the use of liners and bases are described. General awareness and importance of biological reactions in the pulp after cavity preparation are discussed with various treatment procedures reviewed. Pulp reactions are demonstrated with clear, microscopic sections and recent studies are included. Unfortunately the text does not provide a clear guideline describing indications and instrumentation for cavity varnish, cavity liners and bases.

Chapter six deals with the amalgam restoration. The authors are able to clearly demonstrate the required clinical procedures and a conservative approach to tooth restoration.

In chapter seven, esthetic restorations with satisfactory results as well as failures are discussed. The authors wisely mention that "the enthusiasm for the acid etch technique for esthetic corrections for teeth has lead to many interesting experiments but documented long-term clinical investigations on many of the experiments are lacking. High technical skill is needed to arrive at a satisfactory result." However the authors fail to go into sufficient detail regarding cavity instrumentation or restoration procedures, when encompassing both anterior and posterior restorative procedures utilizing tooth colored materials.

In Chapter eight, conservative cast restorations and related procedures are discussed and illustrated clearly and concisely.

Chapter nine, discusses quality assessment in operative dentistry. This is an excellent chapter including colored and black and white photographs with a logical text; which can be used as a model by practitioners, students and instructors, for evaluating the quality of restorative treatment.

Chapters 10 and 11 respectively, deal with periodontal and occlusal considerations in operative dentistry and emergency treatment. Both chapters manage these subjects in a direct and practical manner.

In summary, we would not consider this as a required textbook for teaching the principles of basic operative dentistry to undergraduate dental students. It does not outline in sufficient detail the various aspects of cavity preparation, instrumentation and tooth restoration. An important subject in operative dentistry is the control of moisture in the

operating field; and the effective and efficient use of rubber-dam isolation is not described. This text may be most useful as reference for those with a sound background in operative dentistry; and who are interested in current concepts that could alter, augment or replace traditional procedures, where indicated. △

*This book was reviewed by:
F. Hadavi, DMD, MS
E.R. Ambrose, DDS, FRCD(C)
Division of Operative Dentistry,
College of Dentistry
University of Saskatchewan.*

QUALITY EVALUATION OF DENTAL RESTORATIONS: CRITERIA FOR PLACEMENT AND REPLACEMENT

By Kenneth Anusavice

*1989, Quintessence Publishing Co.,
Inc., Chicago
424 pages, color photographs,
\$96.00*

This book consists of the proceedings of the International Symposium on Criteria for Placement and Replacement of Dental Restorations which was held in October 1987. It is a collection of twenty five papers which had been presented at the meeting and attempts to relate clinical decision making to existing scientific data on this subject. In addition to the papers, brief discussion sections are included which contain the questions which arose and the discussion following the presentation of each paper at the symposium. The book concludes with four sections which summarize the meeting: Summary Statements, Criteria for Restoration Placement and Alternative Treatment, Criteria for Restoration Replacement, and Research and Educational Recommendations.

In the preface, the editor introduces the problem which initiated development of the Symposium, and ultimately the book, that many dental restorations are removed because of the macroscopic appearance of the margins alone with no sound evidence of the existence of caries. He charges that dentists are introduced to this practice as students and that it persists throughout their professional lives. An original goal of the Symposium was to identify the "true longevity" of restorations and

determine the main causes of failure.

The papers, which were prepared by prominent researcher-clinicians, are well referenced with well reproduced illustrations. They cover a wide range of topics in the following areas: reliability of caries diagnosis, bacterial leakage versus microleakage, classification of patient risk, variability of the decision-making process, pulpal response to dental materials and microorganisms, material allergies, assessment of restoration quality, criteria for selection of restorative materials, insurance considerations, and analysis of cost versus longevity of various restorative procedures. The papers provide an interesting presentation and evaluation of existing research data. There is recurring scientific documentation which supports the Editor's accusation in the preface that the diagnosis of dental caries is unreliable and that restorations are being replaced for purely subjective reasons.

Unfortunately, while the problem is more than adequately identified throughout the papers and re-emphasized in the Summary Statements, no detailed solutions are offered. The Criteria for Restoration Placement and Alternative Treatment as well as the Criteria for Restoration Replacement sections are both very general despite their specific titles. However, this could be more of a personal disappointment rather than a legitimate criticism since there was a statement made in the preface that the intention of the concepts and criteria was that they serve as a foundation for the continuing development of well-defined criteria for dental care.

This book raises some important questions regarding the philosophy of restorative dentistry practices related to existing scientific data but presents only generalized guidelines for the practicing clinician. This opinion appears to be supported by a statement in one of the discussion sections which alludes to an earlier criticism of the clinical relevancy of the materials presented at the conference. However, the material does present realistic implications for education and practice. This book is probably more useful to the educator and researcher, but the scientifically oriented practitioner should also find it interesting and informative. △

*This book was reviewed by:
Dr. K.W. Hinkelman*

*Professor and Chairman
Department of Restorative Dentistry
University of Alberta*

LA DENTISTERIE PRÉVENTIVE

*sous la direction du
docteur D.Kandelman*

*Les Presses de l'Université de Montréal
1989 et Masson 1989*

314 pages

Seize auteurs ont collaboré à faire de ce volume un texte particulièrement compréhensif sur le sujet de la prévention. On n'a rien négligé. Une partie du livre traite de façon approfondie de la microbiologie du milieu buccal et

Salivaire, des mécanismes qui sous-tendent les maladies dentaires, et débouche tout naturellement sur la responsabilité des dentistes et auxiliaires en matière de prévention. En seconde partie le volume couvre, de façon pratique, les techniques de diagnostic et les méthodes de prévention. Même la prévention des malocclusions et des traumatismes dentaires y trouve sa place. Finalement les interventions visant à éduquer et motiver les patients sont aussi bien couvertes. Ce livre fournit un tas de renseignements pratiques. Intéressant et bénéfique. △

*Revue par:
Pierre Desautels
Professeur titulaire,
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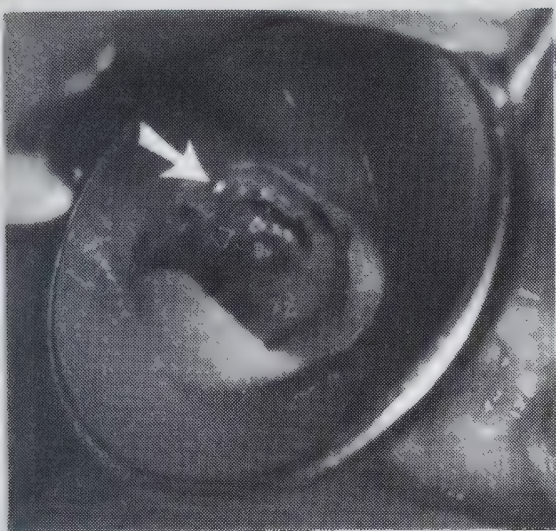
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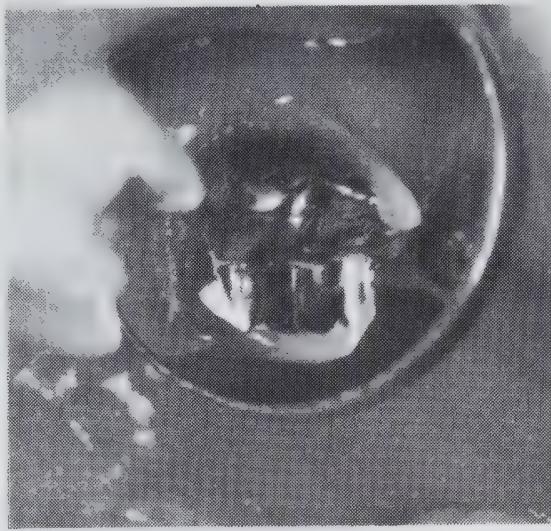
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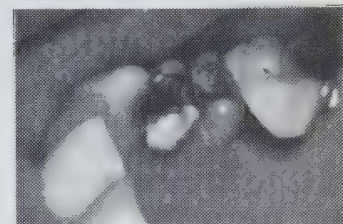
Adhesive breakthrough bonds amalgam to dentin...to enamel...even to old amalgams



Case 41 - Before: Old pin-retained amalgam failed when pin broke at the cavo-restoration junction. (Arrow shows broken pin still in dentin).



Case 41 - After: New MODB bonded to remaining tooth without pins.



Case 23-Fractured lingual wall-New amalgam bonded to old filling and dentin.



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¹Leland Webb, et al. Tooth crazing associated with threaded pins: A 3-dimensional model. J. Prost. Dent. 61:5, p624-626, 5/89.

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Divorce and Support: When and Why

by Gene C. Colman

Marital bliss in the practice of dentistry — does it (i.e. the bliss) last forever? Apparently not! — A couple who met at the University of Toronto School of Dentistry in 1961, married in 1964, and both graduated in 1966, recently took their matrimonial dispute to the Ontario Supreme Court.¹ The results were surprising to some.

The official separation took place at the beginning of 1987. The court decision was given in July 1989. The wife was requesting spousal financial support from her husband for only one year in order to complete her specialty training in endodontics, having enrolled at Columbia University after the split up.

Following the marriage, the wife had been unable to take up regular employment because of pregnancy. She had given birth to two children (1966 and 1970). From 1967 to 1969 the husband attended graduate school, obtaining his specialist degree in orthodontics. During that period the wife held two part-time jobs and was the main source of income for the family.

The wife argued that having done only basic dentistry over the years, she had grown "rusty". If she were to work full time, she would feel more comfortable as a specialist. Yet Judge Bolan found that:

1. Her work as a dentist was not limited by her role in the marriage as a wife and mother;
2. She worked part-time because it suited her lifestyle;
3. There was no evidence that she was not capable of maintaining employment in dentistry (ie. without pursuing a specialty).

The reported decision does not mention if the couple employed live-in or other help to assist with child care and what roles the parties played in raising the children. The Judge's conclusion that part-time work simply suited her lifestyle begs the question. Did the husband acquiesce in this lifestyle decision? If so, should the wife be bound to suffer economic prejudice upon the break-up of the marriage? After having helped to put the husband through his post-graduate training, some would argue that one further year of financial



Gene C. Colman *

assistance for the wife to complete her post-graduate studies would be inequitable. That extra year of financial help would have helped put her on a truly even footing with her specialist husband.

In this decision, Judge Bolan concurred with the so-called "trilogy" of cases decided in the summer of 1987 by the Supreme Court of Canada.² The "trilogy", some have argued, elevated the requirement of "causal connection" to a *sine qua non* in order to obtain spousal support. Unless the less advantageous financial position of the claimant spouse (usually the wife) was causally connected in some fashion to the roles assumed by the parties during the marriage, support would not be ordered.

Judge Bolan found that no causal connection existed between the wife's financial hardship and the marriage: "...the need for support as a result of her decision to upgrade herself does not find its genesis in the marriage". he stated. In any event, after receiving her property settlement, the wife would have capital of approximately \$300,000.00, the interest from which would be enough, in the view of the Judge, to finance her further education.

The Divorce Act mandates economic self-sufficiency as one of the goals to be achieved following divorce. One's customary standard of living can be

seen as a starting point to assess "need". Then \$43,000.00 of interest income (as found by Judge Bolan) might not be adequate to meet reasonable need, in this case, where the husband was an orthodontist and with presumed earnings in the high five figures or more.

A recent Saskatchewan case dealt with a similar situation and reached the opposite result. In *Scobie v. Scobie*³ Justice Gerein reviewed the couple's eleven year marriage. The couple was engaged in December 1972 and married in April 1975 while the husband was in the second year of a civil engineering course. During the following year the wife's "earnings, along with the money saved from [his] summer employment sustained them until May, 1976 when (he) graduated..." Two children followed in 1979 and 1982. Separation was in 1986 and the court decision was July 1989.

The Judge found that Mr. Scobie would have completed his degree in any event without any contribution from Mrs. Scobie. Therefore, an unequal division of property was not ordered.

However, Mrs. Scobie embarked on further schooling after separation - she became a Registered Nurse and in the process, she incurred \$10,320.00 debt. The judge found that "through her own commendable efforts and achievements", she had achieved the goal of economic self-sufficiency set out in the Divorce Act and accordingly should be compensated for those efforts. The "magnitude of the debt" created the "need of financial assistance and entitled [her] to receive support from (Mr. Scobie)", the judge stated. Accordingly, Justice Gerein ordered spousal support for twenty-four months at \$500.00 per month.

Mrs. Scobie was requesting yet further relief from the court. Having assisted her husband to obtain his degree, presumably having raised the children and thus having been unable to pursue her further education earlier, she claimed support for a further two and one-half years in order to obtain her Bachelor of Science degree in nursing. Justice Gerein would not go that

far. He concluded that she already had achieved a sufficient degree of economic self-sufficiency such that it would not be appropriate for Mr. Scobie to make any further contribution.

After obtaining her first nursing degree, her annual rate of pay was projected at \$27,800.00. Mr. Scobie had an annual income of \$57,600.00. Thus, self-sufficiency did not imply equality of earning power. This view, I suggest, is the prevalent one in Canada today.

On the other hand, from Mr. Scobie's point of view, economic equalization may have been at work. A chart may best illustrate this:

	Husband	Wife
Salary Year 1 & 2	\$57,600	\$27,800
Child Support	- 8,400	+ 8,400
Spousal Support	- 6,000	+ 6,000
Pre-tax Gross Income	\$43,200	\$42,200

In the third year following the court decision, spousal support was to cease and child support would increase to \$9,600.00 per year (leaving Mr. Scobie with \$48,000 and Mrs. Scobie with \$37,400). Yet those who would advocate larger and longer support orders might argue that Mrs. Scobie had two children to feed and care for with only approximately half the combined income of the family during the first two years following the decision.

In *Scobie*, the wife had already incurred a debt going into trial. She received one year's support. In *Patterson*, the wife did not receive one year's support even though it could be argued that her economic disadvantage was analogous to that of the wife in *Scobie*.

What we can learn from these cases and others is that:

1. Economic self-sufficiency does not necessarily mean economic equality;
2. "Causal connection" is in the eye of the beholder;
3. Time limited spousal support to fully complete one's education stalled by the marriage, will not necessarily be awarded. Rather, the spouse claiming support would be well advised to show not only a "need" for spousal support but also, through very cogent evidence, a clear causal connection between:
 - (i) the roles assumed during marriage; and,
 - (ii) the economic disadvantage suffered as a result of the marriage or its breakdown.

These criteria were apparently met in

the case of *Tanock v. Tanock*.⁴ The wife worked as a bookkeeper and receptionist for her chiropractor husband, having given up her career as a licensed practical nurse. Following their separation, the wife commenced training as a dental hygienist. The Judge noted that she had spent the last ten years working in her husband's practice and being a homemaker. She was now a single parent with only moderate earning ability. The court found that she was entitled to support until she finished her training and became established in the work market. The wife received spousal support of \$2,500.00 per month for three years.

Other cases decided subsequent to the "trilogy" have eased somewhat the strict requirements laid down by the Supreme Court of Canada. Judges have argued that the "trilogy" only covered situations where the parties had made their own previous agreement and one side had subsequently sought support over and above what had been agreed to. Therefore, the "trilogy" should not apply to original support applications. The "trilogy" was also distinguished upon the grounds that those three cases had been decided under the "old" divorce Act. The "new" Divorce Act (proclaimed in force during 1986) provided different statutory tests. (The divorce legislation is under the federal jurisdiction). Picking up on this theme, some provincial courts applying their own support statutes in non-divorce situations, argued that the "trilogy" could not apply to their provincial regimes.

The question of whether the "trilogy" of cases requires in all circumstances a connection between the roles assumed during the marriage and financial disadvantage suffered on marriage breakdown has been a hotly debated topic in the cases and the literature.⁵

For example, in Ontario, the Divisional Court (ie. three Supreme Court trial judges sitting on appeal) recently decided that:⁶

The entitlement provisions of the Family Law Act do not require, as a condition precedent to spousal support, any causal connection between cohabitation and need for support or any proof of economic loss or disadvantage caused by cohabitation.

Is it conceivable that in Ontario the court will apply one standard if the

case is under provincial Family Law Act, yet another if the case is under the federal Divorce Act.

The "trilogy" and "causal connection" debate has also raged over the issue of whether there is an obligation to pay spousal support prior to trial (ie. what lawyers call "interim support"). Here too the law varies across the country.

Whether spousal support will be awarded in any particular situation can understandably be difficult to predict. Certainly, where there is financial need, an ability to pay, and some economic prejudice suffered as a result of the roles assumed during the marriage, then support will be awarded. However, some courts will decline to award support where the marriage itself caused the dependent spouse no economic harm. Judicial attitudes across Canada are by no means uniform. The law is in a state of flux, creating a climate where the decision as to the need and extent of spousal support is unusually dependent upon the legal arguments accepted by the court.

References

1. *Patterson v. Patterson*, unreported decision of Judge M. G. Bolan (Ontario Supreme Court), July 26, 1989, digested in *The Lawyers Weekly*, case number 918-016.
2. *Pelech v. Pelech*, (1987) 1 S.C.R. 801, 7 R.F.L. (3d) 225; *Richardson v. Richardson*, (1987) 1 S.C.R. 857, 7 R.F.L. (3d) 304; *Caron v. Caron*, 1 S.C.R. 892, 7 R.F.L. (3d) 274. All three of these cases followed similar patterns of reasoning.
3. *Scobie v. Scobie*, (1989), 21 R.F.L. (3d) 447 (Sask. C.B.)
4. Unreported decision of Judge Owen-Flood (British Columbia Supreme Court), January 4, 1990, digested in (1990) *Weekly Digest of Family Law*, case number 298.
5. The Saskatchewan Court of Appeal has held that the causal connection test does not apply to Divorce Act support cases: *Doncaster v. Doncaster* (1989), 21 R.F.L. (3d) 357. A similar view was advanced by the British Columbia Court of Appeal in *Story v. Story* (1989), 23 R.F.L. (3d) 225. On the other hand, the appellate division of the Nova Scotia Supreme Court adopted the causal connection model for in support in *Heinemann v. Heinemann* (1989), 20 R.F.L. (3d) 236. Similarly, this view carried the day with the P.E.I. appellate division of the Supreme Court in *Mullin v. Mullin* (1989), 24 R.F.L. (3d) 1.
6. *Fisher v. Fisher* (1989), 22 R.F.L. (3d) 225 at 234. (The husband unsuccessfully applied for leave to appeal to the Ontario Court of Appeal).

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Ottawa 1990: Convention Countdown

Dentists of Canada – Come on Down!



To All Undecided Potential Delegates

If you have not already registered for the Canadian Dental Association convention – then come on down. You can still be a part of this meeting. Even though the 'advance registration' period has now ended you and your staff *can* register on site at the Ottawa Congress Centre, starting August 25th. Some Pre-convention courses are sold-out but others are available and the convention,

of course, has more than 50 presentations and many social functions waiting for you.

The Convention Staff at CDA Headquarters will be happy to provide you with more information and, if needed, help you to find hotel accommodation at the last minute.

To All Committed Delegates Who are Pre-registered

Thank you for your support. You are the people who make the work of the convention committee and staff exciting and rewarding. In a convention setting – the more, the merrier!

This column was written at the end of June and at that time, all the exhibit space had been sold out (more than 242 booths) for over a month, more than 50 presentations had been confirmed, AND we'd passed the 1,000 registration mark. Excellent numbers for what promises to be a truly 'capital' event!

Nonetheless, I will ask you for one favour: attract the attention of your friends, be they dentists, dental hygienists, dental assistants or administrative staff, to the program we have developed – the largest the CDA has ever had. By doing so you will help us achieve our goal to build this convention into a major event.

To All Delegates Unable to Attend

If you did not plan well enough in advance and have booked a vacation or have other personal commitments that prevent you from being with us this year, circle August 24 - 28 in your 1991 calendar, and note that we will all be meeting during this time in Quebec City.

A Final Word

This monthly countdown is designed to keep the membership informed about all the planning aspects of the convention. It is also designed to stimulate the interest of potential delegates. As a practising dentist and not a professional writer, I wish to thank all those who helped me meet the many crucial deadlines in producing this material over the past several months, in particular the Journal staff and Louise Despres-Jones. And my special thanks to Janice Edgar, a pillar of the convention, who helped keep the countdown on track.

*Michel Jahjah, D.D.S.
General Chairman
CDA Conventions*



1990 CDA Convention Headquarters, the Westin Hotel, Ottawa.
(Industry, Science and Technology Canada photo)

Ottawa 1990

Information to note for Delegates attending the 1990 CDA Convention

We look forward with eager anticipation to welcoming you and your staff (and family members!) to the 1990 CDA Annual Convention. It's just around the corner and to ensure you have an understanding of where things can be found and what to do when you arrive, we have prepared a brief summary of the information you will require as a delegate.

Advance Registration

If you have registered in advance and have received your tickets and badges, GO DIRECTLY TO THE TABLE IDENTIFIED AS 'KIT' in the Main Registration Area (Ottawa Congress Centre – Second Level) to pick-up your convention kit. Present the ticket marked 'kit' to the attendant. Inside the kit you will find a plastic badge holder, insert your name badge in the holder and wear it at all times during the convention.

On-Site Registration

Dentists, dental hygienists and dental assistants will be required to show their professional membership card if they wish to register at the reduced rate offered to members of the Canadian Dental Association, the Canadian Dental Hygienists' Association and the Canadian Dental Assistants' Association. There is a \$25.00 on-site registration fee for all registrants.

Three on-site registration areas will be open to delegates wishing to register for the convention:

Main Registration Area & General Information Desk
OTTAWA CONGRESS CENTRE – Second Level

Registration • Information • Message Centre Display
WESTIN HOTEL – Banquet Level (in front of the Confederation Ballroom)
CHÂTEAU LAURIER HOTEL – Ground Level (Ballroom Lobby)

PLEASE NOTE THAT ONLY REGULAR REGISTRATIONS CAN BE PROCESSED AT THE WESTIN AND CHÂTEAU LAURIER LOCATIONS. ANY UNUSUAL CIRCUMSTANCES AND REGISTRATIONS REQUIRING SPECIAL ATTENTION MUST BE ROUTED THROUGH THE MAIN REGISTRATION SITE.

Registration Dates and Hours

(all three locations unless otherwise noted)

Saturday, August 25	7:30 – 16:00
Sunday, August 26	7:30 – 16:00
Monday, August 27	7:00 – 16:00
Tuesday, August 28	7:30 – 16:00
Wednesday, August 29 (Westin Hotel ONLY)	8:00 – 10:00

Registration for Exhibits Only – CONGRESS CENTRE ONLY

Guests of Dentists, Exhibitors, Hygienists, Assistants and Administrative Staff may visit the Exhibit Hall by completing the appropriate registration form and having it endorsed by their host. There will be a \$25 registration fee for those wishing to have access to the exhibit hall only.

Exhibit Hours:

Monday, August 27	9:00 – 18:00
Tuesday, August 28	9:00 – 18:00

Ottawa 1990

1990 OPENING CEREMONY

SUNDAY, AUGUST 26TH

17:00 – 18:30

PALAIS DES CONGRÈS, HULL (QUÉBEC)

Buses will begin shuttling delegates from the Westin Hotel to the Palais des Congrès at 16:00.

The show is scheduled to commence at 17:00.

There is no admission charge for the Opening Ceremony – and your badge is your ticket into the event.

Program

Flag Procession featuring the Cameron Highlanders

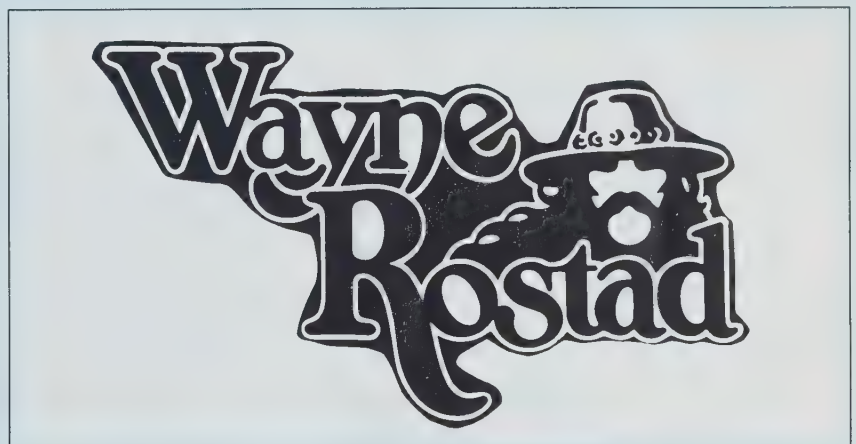
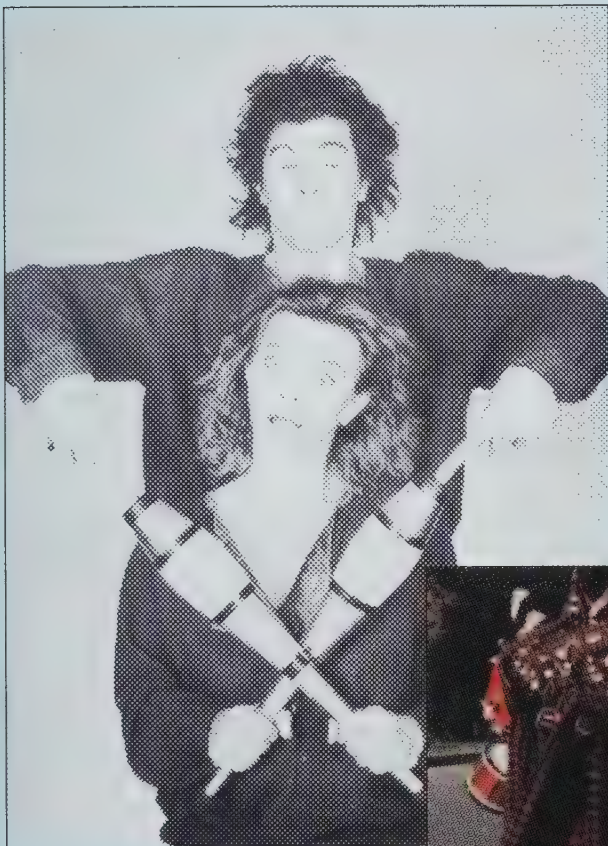
Welcoming Remarks

National Anthem / Slide Presentation

MacCulloch Step Dancers

Jeanginus et Nicollete (juggling act)

Wayne Rostad



Ottawa 1990

President's Gala – Bal Masqué

MONDAY, AUGUST 27

19:00 – 1:00 AM

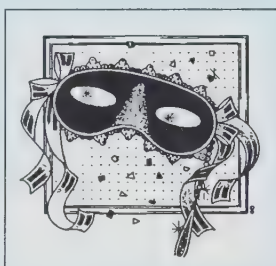
WESTIN HOTEL – CONFEDERATION BALLROOMS

An exciting evening of mystery and intrigue awaits you...

Don your mask and prepare for an exciting evening of dining and dancing. This evening's social extravaganza is a black-tie (optional) affair, however, the wearing of a mask is mandatory.

Do bring a mask as prizes will be awarded for the evening's best.

"STEVENS & KENNEDY", the ultimate, versatile band will perform 'The Best in Live Music'. Ballroom, big band, rock & roll, disco and top forty sounds in a variety of styles, from acoustic to electronic.



STEVENS & KENNEDY

Meet and Greet at the "Bytown Bash"

TUESDAY, AUGUST 28

20:00 – 1:00 AM

WESTIN HOTEL – CONFEDERATION BALLROOMS

A change of style that'll make you smile!

The 'Bytown Bash' is the prime opportunity to get together with members of your dental team for an evening of fun and frolic.

Lively dancing to the music of 'Isle of Skye' recording artists, The Cadillacs, Ottawa's newest and fastest moving party band. The Caddie's repertoire reads like the top of the pop charts from the 50's, 60's, 70's and 80's.

Cash bar.



Babysitting Service – Monday and Tuesday Evening

Thanks to the efforts of the Spouses' and Children's Committee, babysitting services will be offered on a 'first-come, first-served' basis to convention delegates. ON SITE RESERVATIONS ONLY – SUBJECT TO AVAILABILITY.

Ottawa 1990

"Test Your Dental Knowledge"

In the Exhibit Hall at the CDA Convention

**This year the Exhibit Hall has
an added attraction!**

The "Test Your Dental Knowledge" Display will provide you with an opportunity to assess your dental knowledge through self-evaluation in an atmosphere offering fun and a challenge.

Find out if you're up to par...

Drop by the Exhibit Hall and browse through the display. You may even learn something new from the experience!

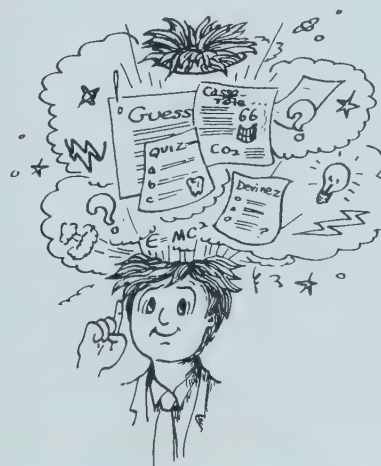
The Ottawa Civic Hospital and the Children's Hospital of Eastern Ontario will each be preparing a series of five case studies for "Test Your Dental Knowledge" participants.

A series of photos and radiographs will be posted and questions posed. Be sure to take a few moments to see if you are up to the challenge!

And for those who love to ponder over 'brain teasers' we'll have a few lined up to stimulate your mind.

Come visit the display –
just for the fun of it!

There will be something for everyone –
don't miss it!!



**This display has been made possible by
Depot Dentaire (Canada) Limitée / Healthco (Canada) Limited**

Ottawa 1990

Visit the 1990 CDA Exhibit Hall and Win ! GRAND PRIZE — PLYMOUTH SUNDANCE



You could be the lucky winner of a 2-door **Plymouth Sundance RS!**

To qualify, be sure to visit the
Aurum Ceramic Dental Laboratories and Classic Dental Laboratories
booths and drop your ticket in the car.

All dentists, dental hygienists, dental assistants, dental technicians,
and administrative staff will be provided with two tickets for the car draw.

Pre-registrants will receive their tickets for the draw in the mail.

**The tickets coded DW1 and DW2 are
your personalized tickets for this draw!**

DW1 may only be deposited on Monday, August 27th.

DW2 may only be deposited on Tuesday, August 28th.

So – to increase your chances of winning – be sure to drop by twice –
once on Monday and once on Tuesday.

This prize is donated by

Aurum Ceramic Dental Laboratories and Classic Dental Laboratories

Ottawa 1990

Exhibit Attendance Prizes Visit the Exhibit Hall and Win ...

**2 Colour T.V.'s, 2 Home Video Cameras and
2 Compact Disc Players will be given away!**

Thanks to the generous support of **Ash Temple – Servident**, CDA Conventions is proud to announce that dentists, dental hygienists, dental assistants and dental technicians visiting this year's Exhibit Hall are eligible to win one of **SIX** great prizes!

YOU could be the lucky winner of one of two brand new television sets, compact disc players or home video cameras – the six prizes to be given away in the Exhibit Hall on Monday, August 27 and Tuesday, August 28 (one of each item will be awarded on each day).

To be eligible to win, just visit the Ash Temple Display in the Exhibit Hall (aisles 400 and 500) and leave your personalized Exhibit Attendance Draw Tickets – that is, the tickets coded AT1 and AT2 – with the draw attendant.

But remember, **only AT1 tickets will be accepted on Monday, August 27th**. These tickets will ensure you are eligible for the draws being held on Monday, August 27th at 17:00 in the Exhibit Hall.

AT2 tickets will only be accepted on Tuesday, August 28th and they will ensure you are eligible to win one of the three fantastic prizes being awarded on Tuesday at 17:00 in the Exhibit Hall.

1991 ANNUAL CONVENTION CANADIAN DENTAL ASSOCIATION

When:

August 24-28,
1991

Where:

Québec City, Québec

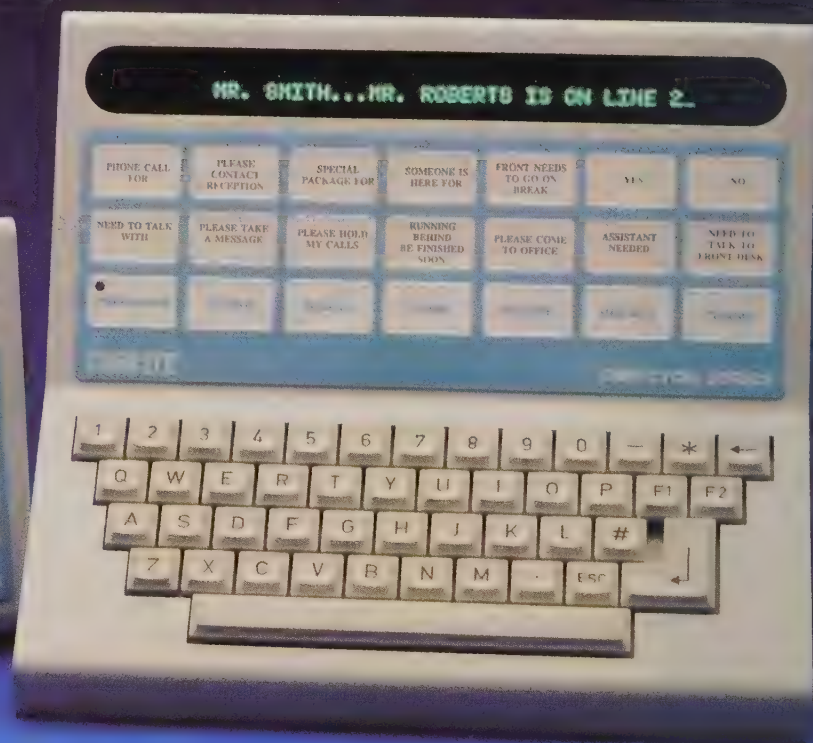
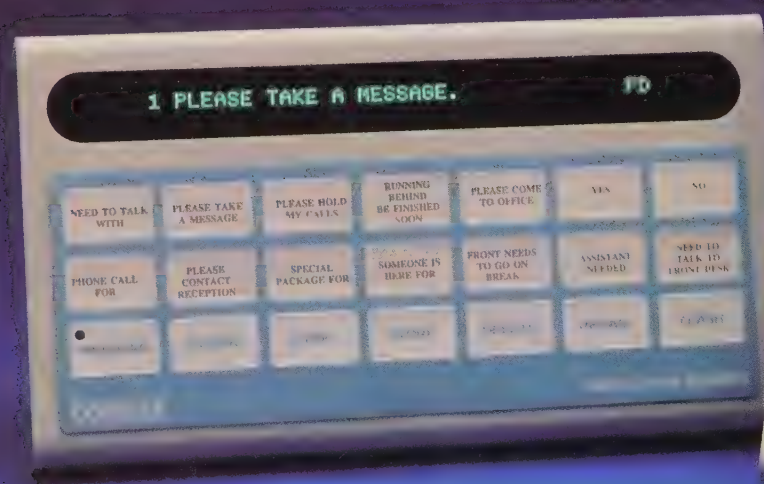


Watch for more details in upcoming issues of the **CDA Journal**.
Registration forms will be available in March, 1991.



The Traditional Intra-Office Communication System Versus...

Come and see us at our booth #101 at the CDA Convention in Ottawa

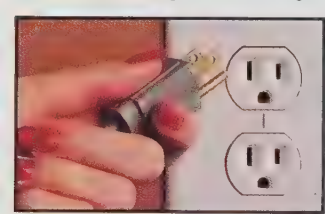


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Specialty Features

Dental Faculties: Future Shock

Dennis B. Gilboe, DDS, MS, Cert. F. Pros.

ABSTRACT

Canadian faculties of dentistry are in an untenable position. The university imposes expectations of research and publications; the profession and the public expect that competent clinicians will be educated. Senior administrators continue to attempt the impossible with diminishing resources and inadequate funding. Until this apparent conflict is resolved, it is unlikely that either of these major responsibilities can or will be effectively fulfilled.

SOMMAIRE

Les facultés de médecine dentaire du Canada sont dans une situation intenable. Les universités leur imposent de faire des recherches et de publier les résultats de leurs travaux, alors que la profession et le public s'attendent à ce qu'elles forment des cliniciens compétents. Quant à l'administration supérieure de chaque faculté, elle tente de faire l'impossible avec des ressources qui diminuent et des fonds qui sont insuffisants. Tant que cet évident conflit ne sera pas résolu, il est peu probable qu'on puisse remplir ou remplit bien ces principales responsabilités.

Cet article a été lu à la Conférence biennale de l'Association des Facultés dentaires du Canada tenue l'an dernier à London, en Ontario.

“Promoting scholarly activity” in Canadian dental faculties continues to be the subject of speeches, workshops, conferences, and publications. Deliberation and debate over several decades have failed to resolve the conflict in perceiving the nature and scope of scholarly activity.

Dentistry encompasses multiple areas of responsibility. It is a profession. It is a clinical science. It is an applied discipline with a foundation in biological, physical, and behavioral sciences. Both as a profession and as a faculty in a university environment, obligations

exist to educate clinicians, and to generate new knowledge which invariably involves some type of research.

The complex relationships between and expectations of each of these areas of responsibility not surprisingly generates vested interest factions. Promotion of one group's perspective, often overtly to the detriment of the progress and development of the others, has resulted in the current state of polarized frustration experienced by faculty, students, and practitioners. Failure to recognize the vital role and contributions of each group, and the desire and need for excellence in all facets affecting dentistry, has become a tragic reality.

This paper was presented at the Association of Canadian Faculties of Dentistry Biennial Conference held in London, Ontario, in 1989.

Scholarly activity is inherent in and must be promoted in all areas of responsibility. Furthermore, it is a conceptual fallacy that these areas entail mutually exclusive activities. An unfortunately destructive attitude is that of perceiving and promoting one area, specifically research, as the primary if not sole vehicle for scholarly performance. Scholarly activity encompasses the development and sharing of knowledge and can take many forms.

Part I. A Teaching Perspective.

“Where professional faculties in a university system have been neglectful of using a research-based model of education, their programs are viewed with skepticism”.

A.R. Ten Cate, Dean, Faculty of Dentistry, University of Toronto from Inaugural speech as president of the International Association for Dental Research

*Professor and Chairman
Division of Fixed Prosthodontics
Faculty of Dentistry, University of Alberta T6G 2N8

presented in March 1984, in Dallas to the 62nd general session of the IADR.

Dental faculties require both clinical and basic science specialists. Competence in either area does not commensurately confer educational expertise. In universities, pedagogical foundations are cursory at best. Educationally questionable testing instruments are further perverted with the flagrant abuse of statistical analysis of their results. The research-based model of education must include not only course content, but also the educational process and evaluation.

Traditionally it has been assumed by university administrators that faculty appointed with the PhD qualification inherently would design courses based on current research and publication in their field. Although less recognized, clinical specialists can claim the same achievement, recognizing essential differences in clinical and basic science research.

A critical review of the literature is fundamental to the preparation of a lecture or design of a course. Knowledge, expertise, and experience is necessary in this effort, whether in a basic science or a clinical discipline. Can this be achieved by one other than a scholar, the Oxford dictionary definition of which is a ‘learned person’, and consequently be regarded as anything other than a scholarly activity?

Teaching may be the most complex and challenging of scholarly activities when content uses a research-based model, presentation uses a research-based model, and testing and evaluation use a research-based model! Yet, in the university scheme of recognition, teaching is comparatively unrewarded.

A 1988 landmark conference on teaching in American universities chaired by Derek Bok, President of Harvard University was broadcast on the PBS television network. University administrators, faculty, and both undergraduate and graduate students expressed their collective disenchantment with inadequate concern for effective teaching resulting in an unacceptable standard of education being

proffered. That universities must reestablish teaching as a priority was virtually unchallenged.

The same issue erupted at the University of Alberta in 1988. Dr. Christopher Knapper, director of Teaching Resources at the University of Waterloo conducted a faculty-wide survey in a "comprehensive study of the role of teaching at the University of Alberta... the *only such study undertaken in Canada in recent years*" (Folio, University of Alberta - December 1, 1988).

The report indicated faculty members' concerns of insufficient recognition of teaching ability in the reward and promotion system, resulting in Dr. Knapper declaring "teaching effectiveness must be linked to procedures that reward good teaching". Charles Vethan, the Student Union Vice-President Academic in an article in the student newspaper, the Gateway (November 27, 1988) pleaded "the university does not require professors to have any instruction in teaching or lecturing before they step into the classroom". In the December 1, 1988 issue of the Gateway, columnist Dragos Ruise "points out a great deficiency in the instruction process: teachers here need to learn how to teach". In the Edmonton Journal of November 27, 1988 Vethan voiced concern of instructors "who don't have the skills and basic mechanics of instruction. They have a wealth of knowledge and can't disseminate it. It is so frustrating to be in a class and you just cannot absorb the information because the information is presented in such a haphazard manner". Olive Elliot, education columnist of the Edmonton Journal, in an article November 28, 1988 challenges "it's about time that the U of A - and a lot of other universities - stopped doing things the way they've always done them".

This evidence is presented as witness to the long overdue appearance of *consumer advocacy in university education*. The educational expectations of and obligations to students are being acknowledged; they remain to be fulfilled. A renaissance period for teaching in universities is upon us.

Many of you are aware of the recruiting effort in Canada for dental students by a major American university. They succeeded by promising a *better education*. "Free trade" for the consumers of dental education exists. Can we compete?

Proposals of "non-tenured clinical professorships" should be promptly dismissed as a further disruption of our educational responsibilities. Clinical instruction is intellectually, technically and physically demanding. The professional responsibilities are enormous. Experienced clinical teaching requires equivalent, and perhaps greater preparation and experience than that expected for competency in research. If clinical teaching is to regain pre-eminence, advanced education beyond a dental degree is essential. Individuals fulfilling these qualifications for a full-time appointment in a dental faculty must be entitled and have the rights to all benefits and obligations in the academic community including research opportunities if they are to be *recruited AND retained*.



It is critically important for students to have outstanding clinical role models, not only to become effective practitioners, but also as an influence to their consideration of an academic career. *Too few Canadian dental students elect to pursue the necessary preparation for an academic career.*

The "C" in faculty stands for clinical. Take out the "C" and what you are left with is FAULTY.

Part II.

A Research Perspective

Of all the basic sciences, only the biological sciences have been the subject of intense scrutiny in dental faculties. Research in the *biological basis of disease* in etiology, prevention and treatment, has developed and flourished due to adequate recruitment of personnel, establishment of physical facilities, and provision of support staff. This was accomplished with measurable funding assistance from university capital and operating budgets. Researchers cur-

rently compete successfully for major grants from, and have earned representation on, established agencies such as the Medical Research Council of Canada. The prominent role earned by biological scientists for their achievements in dental research is enviable. The key elements in their successful profile are *expertise, time, facilities, and funding*.

Research in the physical sciences, emphasizing mathematical analysis and computer modelling, is in its gestation in dental faculties. Research in the *degenerative basis of disease* will not be productive without such expertise. Ultimately, integrated research of both the physical and the biological sciences must be secured as has occurred in orthopedic and rehabilitative medicine. Applied biomedical engineering in the substantive process will profoundly influence clinical research in areas such as mandibular dysfunction, implants, and biomaterials.

Research in the behavioral and social sciences and in education receives little or no emphasis in dental faculties. The effects of their deficiency are alarming. In an era of open expression, an increasing number of students are indicating their stress and distress in coping with the dental environment. They graduate with deficient communication, organization, management, problem-solving, and psychological expertise. *This is a most critical deficiency in dental education*, which can be rectified only with a prioritized and concentrated research effort.

Clinical research is somewhat like the weather... everybody talks about it but nobody does anything about it. The present generation of clinical specialist has been prepared and has expectations of the opportunity for clinical research. In Canadian dental faculties, there is an apparent failure to understand that *clinical research is different* from basic science research. Admittedly, the prevalence of clinical "trial and error" projects bordering on human experimentation, featuring anecdotal records devoid of structure or objectivity, has exacerbated such misunderstanding. Clinical research is in fact incredibly demanding in the best circumstances. Undefined parameters have a habit of influencing test data, sample population sizes are frequently dictated by economic, time availability, and manpower limitations. Longitudinal studies are further compromised with our mobile population in a geographi-

cally immense country. Ethical dilemmas abound. Both time and personnel needs can be enormous. The ultimate handicap is that funds for clinical research are pitifully and disproportionately inadequate. In the past decade, less than 10% of federal funding (the Medical Research Council of Canada and Health and Welfare Canada) has been allocated for clinical research in medicine and dentistry. Furthermore, their guidelines preclude successful application by faculty having less than half their time available for research. Few clinicians will compromise their professional teaching obligations to fulfill this arbitrary research qualification; few deans and their budgets allow such a choice. The little funding available in dentistry is derived from small provincial operating grants or from the dental industry.

The impasse is neatly symbolized by the title of a popular film: "Don't Shoot the Teacher". The solution: *time, facilities, and funding*

"In Britain an appeal has been launched to raise sufficient funds to permit a detailed study by a group of *outstanding non-dental professionals of dental research* world-wide and to point the way to more vigorous and possibly new attacks on dental disease". A.R. Ten Cate (previously cited I.A.D.R. address, 1984).

The needs confronting both the public and the dental practitioners can be addressed only by a *cooperative effort of clinicians and basic scientists in defining research directions*. Clinical research and clinical trials are integral processes of the research spectrum in health sciences.

Perhaps Dr. Ten Cate's statement in the earlier cited address "the *currency that really counts* is scholarly activity and research activity" inadvertently committed a "Freudian slip". Research grants are measurable in *monetary terms* by administrators, which is hopefully further quantified by a number of publications. Has success in obtaining research grants become more important than scientific knowledge and inquiry by the self-serving fiduciary interests of faculty and university administrators? Have students and education become mere pawns in the resulting scenario?

Has dental *education* benefitted from the research activity in its faculties? One Dean responded positively to an ACFD survey conducted in 1983 that



research conducted in his faculty in the previous ten years had affected either the undergraduate curriculum or clinical practice. *NO* research or publications have demonstrated a correlation between the amount of research in any dental faculty and the quality of either its teaching or its undergraduate curriculum.

Part III. Faculty Facts

The following data was derived from the 1988-89 full-time faculty register compiled by the A.C.F.D. and is the basis for the following statements.

Facts:

There are 396 full-time academic staff in Canadian dental faculties. 292 (73%) are in clinical disciplines; 104 (27%) are in oral biology.

42 faculty (11%) have more than 25 years full-time university service.

51 faculty (13%) have 20 - 25 years full-time university service.

Commentary:

One quarter of all academic staff will approach retirement in the next ten years.

Facts:

66 (17%) of faculty have less than five years of full-time university service.

38 (10%) of faculty have 5 - 10

years of full-time university service.

Commentary:

There appears to be a high attrition rate in the initial years of academic appointments.

Facts:

16% of basic science faculty have a Canadian DDS degree.

Of all basic science faculty, 39% received their PhD in Britain, 27% in the United States, and 27% in Canada. (The remaining % received their PhD elsewhere).

If Quebec is excluded, 52% received their PhD in Britain, 25% in the U.S., and 20% in Canada. 78% of clinical faculty have a Canadian DDS degree.

Of clinical faculty with a Canadian DDS degree, 45% received graduate education in Canada, 55% in the United States.

If the University of Toronto is excluded, 32% received graduate education in Canada, 65% in the U.S. (21 of 29 clinical faculty at the U. of T. received graduate education in Canada).

Of all Canadian faculty with less than 10 years as full-time academics, 19% have no advanced certification or degree; of those with a Canadian DDS, 21% have had no advanced education.

Conclusions:

Approximately two-thirds of Canadian dental faculty have

completed advanced education for academics outside Canada.

Approximately 135 new faculty will be required to replace projected retirements and resignations in the next 10 years. This is *one-third of all existing faculty positions*.

There appears to be an increase in new clinical faculty appointments without advanced education; they are likely in a sessional, non-tenured stream.

Graduate programs in the basic sciences and clinical specialties in Canada have produced less than one-third of our existing faculty. *Canadian dental faculties face a manpower CRISIS within 10 years.*

Insufficient Canadian graduate programs in dentistry exist to maintain current faculty positions.

Part IV.

An Administrative Perspective

The leadership requirements in dental faculties and universities are no different than those identified in business.

An enlightened perspective can be derived from the Leadership in Business column, "Smart firms listen to their workers" by Ron Chalmers, in the May 2, 1987 issue of the Edmonton Journal:

"Decision making had depended on the opinions of supervisors and managers (until it was recognized)... the company was wasting the insights of most of the workers — and acting on opinions rather than facts".

"More employee involvement also means more emphasis on leadership".

"Now leadership means people with vision". (Royston Greenwood, Professor of Organizational Analysis at the University of Alberta).

"Effective leaders define core values".

And finally,

"In today's competitive markets, there's little safety in always playing it safe".

Management by crisis is too prevalent in dental faculties. Long-range planning including definitive implementation strategies either are non-existent or closely guarded secrets. A simple yet dramatic example: from where will the new faculty needed come?

The following comments appeared in " 'Professional' management can lead



to trouble in universities" by anthropologist Jerome Barkow of Dalhousie University in the December 17, 1988 issue of the Financial Post:

"Professors see themselves as the university. They do the research, the teaching, the program creation. Professors think of administrators not as management but as support staff".

"Modern managers move authority as far downward as possible... [it] will not only boost morale, it will make for more effective decision-making. The people closest to the situation have the most knowledge of it".

"An open management style, making all information readily available to all faculty... [will] put an end to suspicion and rumor". "Anything less than the provision of all information leading to a decision [is considered] as secretiveness".

Administration must be structured to facilitate optimum performance of faculty in both teaching and research. Faculty have the capability and experience to manage themselves. Recommendations for change must be tested on their merits, rather than being prejudged by academic or administrative rank. The foremost attribute of a Dean, as chief executive

officer within the faculty is, *leadership*. The vision to guide directions for the pursuit of excellence, and the confidence to take risks to attain that status are essential. Establishing and maintaining co-ordination in *all areas of responsibility* is dependent on inherent and cultivated interpersonal relationship and communication skills. The aptitude to delegate responsibility while assuring accountability is obligatory.

The foregoing concepts are advocated for university administrators and faculty search committees in selecting a dean in dentistry. Previous success in teaching, research, or administration has not been demonstrated as an accurate predictor of the leadership and vision necessary as a dean. Determination of a candidate's suitability surely requires a more sophisticated approach than deliberation on a curriculum vitae and the usually cursory interviews probing candidate's attitudes on the vested interest areas of the individual faculty member. The validity and reliability of subjective opinions of the candidate's performance capabilities would be enhanced if the selection process included the participation of a competent industrial psychologist or similarly qualified professional.

The curve of a dental faculty is a Dean who provides management rather than leadership.

Part V. Planning for the Next Century. A blueprint for achievement.

or, Great Expectations

The debate on the nature and heirarchal levels of scholarly activity hopefully will be rendered a dignified demise. The focus now can be directed to a critical evaluation of the *mechanisms for its attainment by establishing implementation strategies* in the multiple areas of responsibility dentistry encompassess.

Resources must be identified before expectations can be defined. The crucial resource in dental faculties is personnel. Both the number and qualifications of faculty in a particular area of responsibility must be sufficient to anticipate scholarly productivity.

A current, dynamic curriculum is the backbone of the educational area of responsibility. The expectations of dental faculties by the public, the profession, and students impose this priority. Changing curriculum needs determine the qualifications and expertise of new faculty who must be recruited. The research directions and capabilities within an individual faculty of dentistry consequently should be predicated by its curriculum design if the ultimate integration of teaching and research is to be realized. In this context, scholarly activity, encompassing both teaching and research achievements, is *dependent on the leadership, insight, support, and coordination of enlightened faculty and university administrative structures.*

Major curriculum revisions are required to adequately prepare graduates to serve the altered demographics and disease patterns of the Canadian population. Previously underemphasized areas of research such as the physical sciences and the degenerative basis of disease must be addressed.

A national analysis of current full-time faculty and budgets is necessary, in combination with existing surveys of the number of dental graduates required. The system of advanced qualification in Canadian dental faculties has produced only one-third of staffing needs. One-quarter of existing faculty will retire by the end of the next decade. More graduate programs in dentistry, in both clinical and basic sciences, are indicated to fulfill both current and future educational and research expectations. Whatever benefits accrue with an international faculty, the lack of clinical graduate

programs is simply unacceptable for an optimistic future of dental faculties. A major source of academic stimulation for clinical specialists is contribution to a graduate program and its inherent clinical research activity. The concurrent influence on the undergraduate program and students is significant. A uniquely Canadian approach to clinical graduate programs would enable a composite of the most desirable features of the American and British systems.

Rational decisions on the long-term needs can be made only with statistically substantiated data. If future projections are massive reductions of the undergraduate student population, and creation of a significant number of graduate programs, faculty recruitment needs will be markedly different than current standards. The institution of graduate programs is *fundamental to the establishment of a Canadian identity in dental research.*

The frequently *conflicting expectations and obligations of the faculty of dentistry* to the university and to the profession require resolution. Each faculty of dentistry operates as a stand-alone "cottage industry" serving two masters: the university, and the profession and public. The university fittingly imposes expectations of scholarly activity. The profession has allocated the responsibility for determining clinical competency. Dentistry is the *only profession in which the entire educational and evaluative process and de facto licencing powers occur within the university!* The professional experience and certification of physicians, nurses, lawyers, or accountants is not man-

dated within the respective university faculty. The responsibilities of faculties of dentistry in Canada are by comparison, quite simply, unreasonable and excessive. As long as this situation prevails, it is a ridiculous assumption that clinicians have the opportunity to pursue scholarly excellence with current staffing allocations.

This independence is both a formidable handicap and a major opportunity to justify funding reassessments of faculties of dentistry. Alternatives to the traditional sources of funding can be anticipated only if the faculties are responsive to co-operative planning with governments and the profession. Both agencies must be educated to the changing role of our faculties, and enlisted to participate in long-range faculty reorganization. The increasing interest in university operations by the community through the press can be fostered as a constructive influence to catalyse favorable administrative decisions.

Faculties of dentistry in Canada can regard future needs either as problems or as unrealized opportunities. An individual dental faculty which cannot or will not plan and function as a team of complementary professionals is unlikely to be a survivor; at least one faculty is apt to cease operation in this country in the next decade. Canadian faculties require leadership with a commitment to develop all facets of scholarly activity with conviction and intensity in order that all areas of responsibility in dentistry achieve excellence. △

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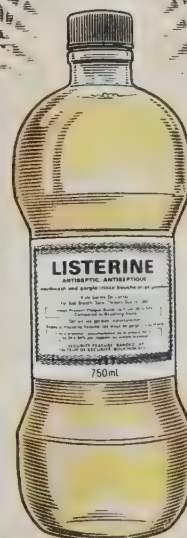
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Taxing Consumption: The GST

Allan M. Maslove, PhD.

If events unfold as the federal Tories hopes, on January 1, 1991 the new GST will become a reality. GST stands for the Goods and Services Tax. Supporters argue that it stands for the "Good and Sound Tax"; critics say that it is the "Gouge and Screw Tax". Playing with acronyms aside, the GST does mark an important event in the history of taxation in Canada. As in many such initiatives, the introduction of the GST actually involves a combination of several policy changes by the government. It represents both the replacement of an outdated and inefficient tax with an improved model, and an alteration of the country's tax structure, as well as other changes.

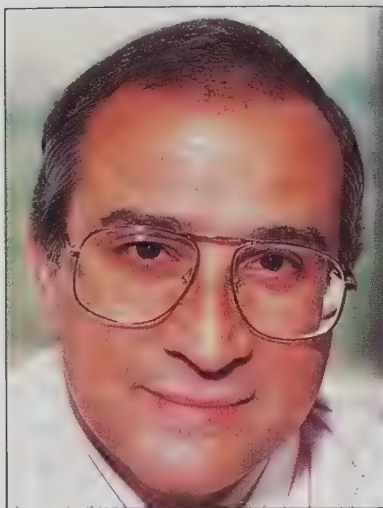
For professionals who provide services to people (such as dentists) the GST will impact upon them in two ways. They will be affected as suppliers and as individual consumers. Later we will look at both impacts. First, however, it is useful to examine the GST more broadly.

Why the GST was introduced

Most of the revenue that the GST will generate will be used to replace the existing federal manufacturers' sales tax (MST) which is being eliminated. A good starting point then is to ask what is wrong with the MST and why this government decided to replace it.

There are four main problems with the MST. It is inefficient, invisible, inequitable, and an uncertain source of revenue. The tax is inefficient because it taxes a narrow range of manufactured commodities at a relatively high rate, and thereby distorts resource allocation in the economy. Often cited examples include the tax which becomes embedded in our exports thereby placing Canadian firms at a competitive disadvantage in international markets, and the effectively greater tax burden often placed on domestically produced goods in comparison with imported goods. These concerns were magnified with the signing of the free trade agreement with the U.S. and the increasingly competitive world markets.

The MST is probably the most invisible tax of any significance that is levied



Allan M. Maslove, PhD.

The Author

Allan M. Maslove is a Professor in the School of Public Administration at Carleton University. An economist specializing in public finance, Dr. Maslove is a graduate of the Universities of Manitoba and Minnesota. He was formerly a senior economist with the Economic Council of Canada. He is the author of numerous articles and several books, including *Tax Reform in Canada*, *Wage Controls in Canada: 1975-78* (with E. Swimmer), and *federal and Provincial Budgeting*. Dr. Maslove was the editor of the 1984 and 1985 editions of *How Ottawa Spends*, an assessment of federal government policy produced annually by the School of Public Administration. He has been a consultant to agencies and departments at all levels of government, and to the MacDonald Royal Commission.

In 1980-81, Dr. Maslove was a visiting professor at the University of California at Berkeley. He was the Director of the Carleton School of Public Administration from 1981 to 1987. During 1987-88, he was Scholar-in-Residence at the Institute for Research on Public Policy.

by any level of government in Canada. Few people realize that the tax is embedded in the prices of *some* of the goods they buy and virtually no one has any accurate idea of how much s/he pays. Invisible taxes are undesirable because they make it more difficult for taxpayers to hold government accountable for its revenue raising and expenditure programs.

The Manufacturers' Sales tax is unequitable because its burden falls more heavily on poor people relative to their incomes than on those who are well off. As such it violates one of the commonly accepted principles of good taxation, the "ability-to-pay" principle. Finally, the MST has increasingly become a less certain source of revenue for Ottawa as firms have discovered new ways to organize their activities to avoid some of the tax they would otherwise pay. This may not be of concern to us as taxpayers, but it is very much a concern of the federal government, especially in light of the large budget deficit.

These problems, and others, while important, are not new. What then explains why the federal government waited until now to correct the situation? In large part the explanation has to do with the election of a Conservative government in 1984 (and again in 1988) that has advocated and pursued a policy of government restraint and strengthening the forces of the free market. It has been the consistent objective of this government to minimize the role of the state in private decision making (including tax considerations), and to rely on market incentives and private initiatives to drive economic development. That is why the personal and corporate income taxes were reformed in 1987-88 and why the sales tax system is currently undergoing restructuring.

Impacts of the switch to GST

The main long term benefit from switching to the GST is a gain in economic efficiency. This benefit will be manifested in the form of increased exports, increased investment and economic growth, and ultimately higher levels of national income. For the

government, the GST promises to be a more reliable and growing source of revenue because of the broad array of goods and services included in its base. While most analysts agree on these long term effects, there are transitional impacts which are more problematical.

The new GST will raise enough revenue for Ottawa to replace what the old tax would have generated (about \$18.5 billion in 1991), plus enough to pay for the enriched refundable sales tax credit for low income families, the extra administrative expense, and several other adjustments that are linked to the introduction of the new tax. To finance these additional items, the GST will raise an additional \$5.5 billion in 1991.

To generate all this money the GST will be levied on virtually all goods and services consumed by individuals at a rate of 7 per cent. (We will discuss the exceptions later.) The government's estimate (and it is supported by several independent analyses) is that this will cause the overall price level to rise by a little more than 1 per cent. In theory, this should be a once-and-for-all adjustment and therefore would not constitute an addition to the country's inflation rate. However, uncertainty arises because we cannot be sure that people, firms and unions will not react to the increase by adjusting their own behaviour. For example, if unions successfully seek higher wage increases to compensate their members for the higher prices, pressure for *on-going* inflation will increase. The greater this pressure, the longer it will take for the economy to adjust to the GST and the longer it will be for the benefits of the tax change to be realized.

There will also be significant distributional impacts in the switch from the MST to the GST. First, consider only that portion of the GST which replaces the MST. The goods and especially the services (everything from dry-cleaning and haircuts to accountants' and lawyers' fees) which will be taxed under the GST are consumed relatively more by higher income people than are the goods currently taxed under the MST. Therefore this replacement portion of the tax represents a progressive move towards having tax payments more in line with ability to pay.

But, as we noted earlier, the GST will raise additional revenues. Another way to think of this component is in terms of a shift away from income based

taxes towards increased reliance on consumption based taxes. In all likelihood this shift is regressive, that is, the relative burden on lower income families is increased. In precise terms, the net impact of these two contradictory moves is, thus far, unclear. In general terms, it is likely that when all adjustments are taken into effect (income tax and refundable credits), families below about \$30,000 will be better off and families earning more than about \$40,000 will end up paying more. The net increase for the latter group will average less than one per cent of income in 1991.

A good deal of attention has been focussed in recent months on the administrative costs associated with the GST. Many of these costs are as a result of the failure to date to secure the cooperation of the provinces to operate a single national sales tax.

...families below about \$30,000 will be better off and families earning more than about \$40,000 will end up paying more.

Retailers who collect provincial sales taxes, will now be federal tax collectors as well. Many will have to deal with a situation in which GST is levied on items that are not taxed provincially (the reverse is very unlikely). Others, who have not been involved in tax collection before, primarily suppliers of various services, will now be required to set up systems to collect the GST. Finally, the government itself will incur significant additional costs to collect the tax and administer the system.

The GST and dentistry

We noted earlier that the GST will affect dentists in two ways, as consumers and as professionals. The price and tax burden impacts on consumers has been discussed in the previous section. In this section we will briefly look at the impact on dentists as suppliers of a particular service.

There are three categories of goods and services under the GST. The vast majority of goods and services (including elective cosmetic dental services) will be defined as "taxable supply" and taxed at the standard rate of 7 per cent. Suppliers of these goods and serv-

ices will be eligible to claim an input tax credit paid on inputs they have purchased. They will remit to the government the difference between the tax they collect and the credit they are eligible to claim on their inputs.

The second category is referred to as a "zero-rated supply". These goods and services are, in principle, taxable just as the first group, but the tax rate for these goods is set at zero. This means that suppliers collect no tax from consumers, but they still are eligible to claim the credit for GST paid on their inputs. Thus, they will receive a refund from the government, which effectively eliminates all tax from these commodities. Basic groceries are in this category.

The third category includes dental services (except for the cosmetic procedures noted above), most other medical services, and several other services. These are defined as "tax-exempt supplies"; no tax is levied on final consumers but suppliers are not eligible to claim a credit against GST paid on inputs. The cost of operating a dental practice will thus increase because of the GST paid on purchases such as office rents, some materials and accounting services. (There is no tax paid on salaries to office staff.) Because the GST is paid on only a portion of total expenses, operating costs will increase by much less than 7 per cent, perhaps in the range of one to two per cent. In part, the increase will depend on how the office is organized. For example, if all bookkeeping services are performed by an employee, the salary is not taxable; if these services are purchased from a separate company, they will be taxed at the rate of 7 per cent.

Will this extra business expense result in higher fees to patients or will it be absorbed by the service providers? Probably some of both. In this sense the tax is exactly like any other increased business expense such as higher salaries or office rent. For that matter, if dental services had been fully taxable at 7 per cent (accompanied by a credit for the tax paid on inputs), it is unlikely that the full amount of the tax would be paid by patients. When all adjustments are complete, dental fees would probably be lower than they otherwise would have been. In all these cases practitioners are constrained in raising their fees by the sensitivity of the demand for their services to higher prices. Economists call this price elasticity. In the final analysis, the GST

will be split in some proportion between dentists and their patients.

Conclusion

As the foregoing discussion suggests, specialized groups will be affected by the introduction of the GST in various ways, depending upon how their supplies are categorized. In general terms, though, the GST marks a relative shift from income-based to consumption-based taxation, and this may turn out to be the most consequential effect of its introduction. The government is taking a clear step in the direction of raising a greater share of its revenue from taxing peoples' consumption activities and a correspondingly smaller share from taxing income-earning activities.

What are the consequences of this shift? The most commonly cited argument in favour is that by reducing (at least in relative terms) taxation on income earning, enhanced incentives for investment and work will result, leading to higher economic growth and higher incomes in the future. The most commonly cited argument against this shift in the tax system relates to equity. Consumption taxes levied on goods and services (as distinct from general expenditure taxes) tend to be regressive. A significant shift in this direction will therefore make the entire tax system less equitable.

While there are no easy answers to many of these questions, it is important that Canadians be aware of the broad impacts of their tax system as well as how they personally might be affected.

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Louis Joseph Papineau
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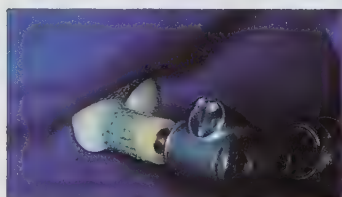
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C.G. Ibbott, DMD, FRCD(C)*

J.D. Criton, DMD**

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*250 - 2550 15th Ave. Regina, Sask. S4P 1A5.

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This article represents a simple compilation of some of the most common errors and complications seen in an implant practice. The list was developed from the problems encountered in a single solo practitioner office. The article's list of complications is by no means complete. Such problems as nerve damage, jaw fracture and other surgical complications have not been addressed. However, the problems which are listed are applicable to ALL implant systems since no system is immune to failure.

Dental implants fail for a variety of reasons. Many failures we see may be a result of improper case planning. Too short or too few implants may be utilized. A surgical stent may not be used or ignored by the surgeon. Inadequate knowledge of occlusion may result in implant overloading and subsequent failure. Because Implantology is not an exact science, even a gifted clinician using a system with well documented success cannot avoid some instances of implant failure.

We must make every effort to perform to proper standards of care for



Dr. C.G. Ibbott

implant procedures to minimize the occurrence of unfavorable sequelae.

Practitioners must be prepared for long term maintenance of the implant patient. This involves the management of soft tissue problems and normal wear-and-tear maintenance of prosthetic components. This long term attention will contribute positively towards the success of an exciting but expensive proposition for the patient. △

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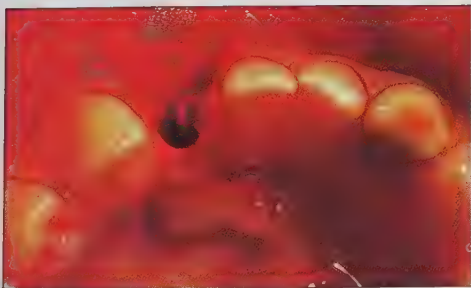


Photo 1



Photo 2

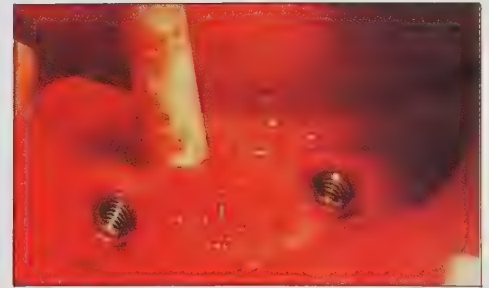


Photo 3



Photo 4

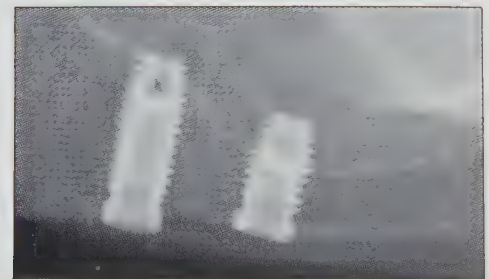


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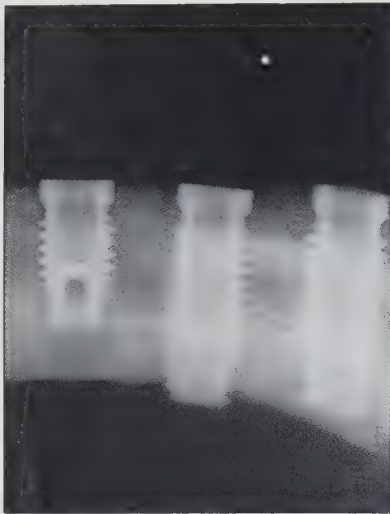


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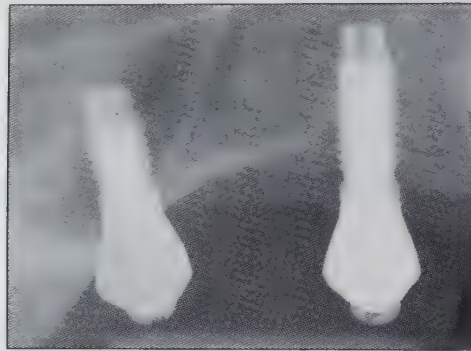


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Photo 8

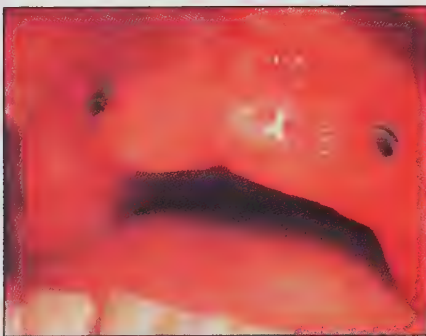


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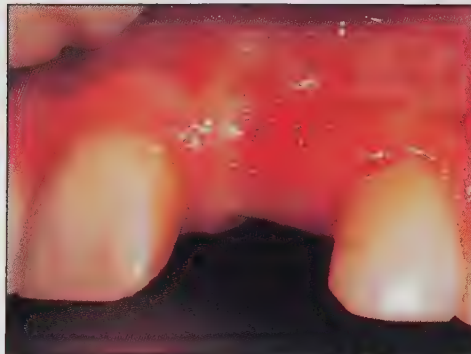


Photo 10



Photo 11

COMPLICATION	PHOTO	POSSIBLE CAUSE	CORRECTIVE ACTION
Inadequate bone width for implant placement.	1	Error in clinical judgement. Improper interpretation of radiographs.	Abort procedure or attempt bone graft or guided tissue regeneration so site may be used in future.
Fenestration	2	As above	As above.
Over-countersink	3	Poor surgical technique.	Continue with procedure and hope for the best.
Perforated coronal bone	4	Inadequate bone width.	Use guided tissue regeneration or bone graft.
Implant placed into a sinus cavity	5	Poor surgical planning.	If fixture is left, be aware that loss of integration is more likely to occur than if the implant is anchored into the cort-bone of the sinus.
Implant instability		Eccentric drilling or tapping or stripping of bone threads.	Replace with a wider implant.
Drilling through inferior border of the mandible	6	Poor surgical technique.	Hope for the best. If infection results, implant must be removed.
Low density bone	7	"Eggshell" type bone quality.	Use a self-tapping fixture. Do not countersink. Can use an HA coated implant.
Infection around covered implant	8	Poor surgical technique. Improperly seated surgical insert or loose cover screw.	Surgery and replacement of surgical insert or cover screw.
Dehiscence	9	Poor flap design. Local irritation from a removable appliance. "Too" thin tissue at coverage procedure.	Relieve appliance. Before 6 weeks replace cover screw or surgical insert ... cover with free gingival autograft or pedicle flap. After 6 weeks clean with a .2% chlorhexidine every second day.
Fistula formation	10	Suture remnant. Loose cover screw or improperly seated surgical insert.	Remove foreign body. Surgery and replacement of surgical insert or cover screw.
Damaged hex nut	11	Improper insertion.	Replace implant.
Failure of fixture to osseointegrate	12	Poor surgical technique. Contamination. Irritation from a denture.	Remove implant and curette socket. Close site for at least six months before using the site again.



Photo 12



Photo 13

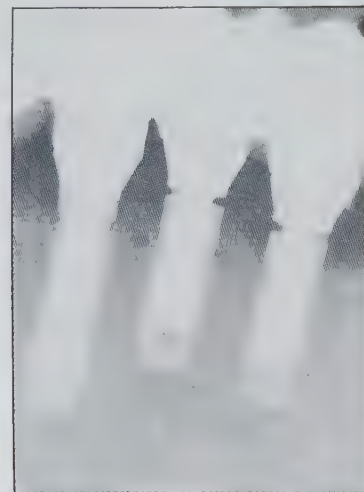


Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19

COMPLICATION	PHOTO	POSSIBLE CAUSE	CORRECTIVE ACTION
Surgically produced edema at Stage 2 surgery	13	Healing caps not used at abutment connection	Place healing caps and cover with perio pak for one week.
Abutment not properly seated	14	Radiographs not taken to verify seating.	Re-seat threaded abutment and verify with radiograph. If abutment is cemented, abutment must be drilled out and replaced.
Improper length of abutment cylinder	15	If abutment does not project at least 2 mm. above mucosa tissue will overgrow the abutment.	Replace with a longer abutment. If abutment is cemented, abutment must be drilled out and replaced.
Infection from cement overhangs	16	Surgical exposure not done at time of cementation.	Flap for cement removal.
Malpositioned implants	17	Failure to use a surgical stent.	Use angulated abutments.
Poor oral hygiene Plaque and Calculus	18	Home care instruction neglected.	Review home care.
Gingivitis	19	Poor patient cooperation.	Scale with plastic scalers. Irrigate with 2% chlorhexidene. Polish with rubber point. Review home care.
Gingival hypertrophy	20	Plaque/calculus. Titanium tissue reaction reaction?	Scaling/prophy Gingivectomy Possible free gingival autograft. Bacteriologic testing if an antibiotic to be used. Possible chlorhexidene irrigation. Change in abutment length. Change from titanium to gold abutment.



Photo 20



Photo 21

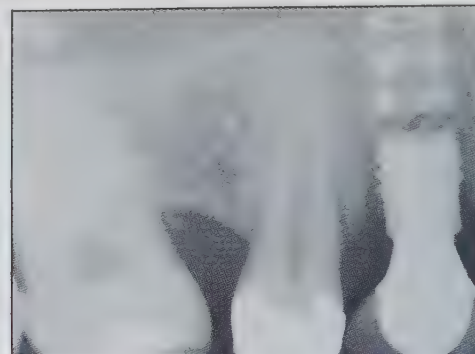
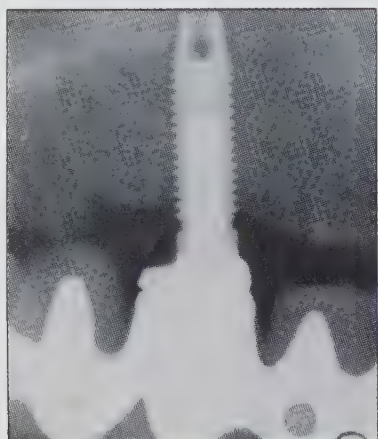


Photo 22



23 Complete peri-implant radiolucency.

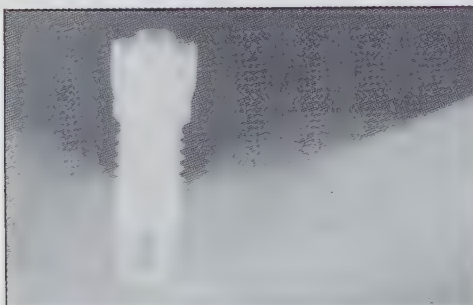


Photo 24



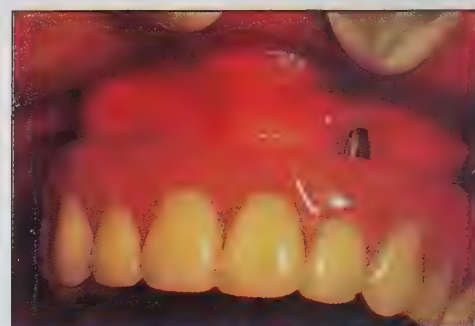
Photo 25



Photo 26



Photo 27



28. Artificial gingiva has been added.

COMPLICATION	PHOTO	POSSIBLE CAUSE	CORRECTIVE ACTION
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Partial osseointegration or Failing osseointegration	24 25	Surgical trauma. Implant overloading.	Adjust occlusion. Antibiotic therapy Guided tissue regenerated
Fixation screw fracture	26	Poor bridge fit/occlusal problem.	Adjust fit/occlusion. Place a new screw
Prosthesis fracture		Improper waxing. Overloading cantilever.	Remove and repair.
Abutment fracture	27	Poor design. Overloading.	Replace abutment. Check occlusion.
Functional speech problem	28	Inadequate artificial gingiva.	Fabricate artificial gingiva.



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Quebec Dental Manpower and Demand for Dental Care from 1985-1988

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ABSTRACT

The rapid growth in the number of practising dentists is a major concern of the dental profession in industrialized countries. Three surveys conducted in Quebec in 1971 (N=1552), 1985 (N=840) and 1988 (N=1059) examined the growth in dental manpower and demand for dental care between 1985 and 1988 and made a comparison with the 1971-1985 period. On average, the yearly increase in the number of active dentists was 4.2 per cent between 1971 and 1985 whereas the yearly increase between 1985 and 1988 was only 2.5 per cent. The percentage of the population using dental services annually was 47 per cent in 1988, compared to 51 per cent in 1985. An age-specific comparison with the United States showed that the proportion of Quebec adults visiting the dentist within the last 12 months varied between 30 per cent and 63 per cent and that of the U.S. between 41 per cent and 61 per cent. Thus, as the number of active dentists continues to grow, albeit at a slower rate, the demand for dental care appears to have reached a plateau and has attained the American level for adults under 50 years of age.

ABSTRACT

La croissance accélérée du nombre de dentistes crée de l'inquiétude chez la profession dentaire de tous les pays industrialisés. Trois études faites au Québec en 1971, 1985 et 1988 permettent de suivre l'évolution de l'augmentation des effectifs dentaires et de la demande pour les services dentaires de 1971 à 1988, et plus spécifiquement de 1985 à 1988. La croissance annuelle moyenne du nombre de dentistes actifs s'élevait à 4,2% de 1971 à 1985 alors qu'elle n'était plus que de 2,5% de 1985 à 1988. D'autre part,

47% des Québécois ont eu recours annuellement aux soins dentaires en 1988 comparativement à 51% en 1985. En dépit de l'augmentation annuelle du nombre de dentistes, la demande pour les services dentaires semble avoir atteint un plateau, semblable par ailleurs à celui des Américains de moins de 50 ans.

The rapid growth in the number of practising dentists is a major concern of the dental profession in industrialized countries¹. Accordingly, the issue of excessive dental manpower has received widespread attention in the literature²⁻⁵. This increase has been of concern as it occurred at the same time as demographic changes and a decline in caries prevalence and severity among children and teenagers. These considerations have led Lewis⁴ to conclude that the combined and compounding effect of demographic and epidemiologic changes leading to greater personal and tooth survival is probably the most important consideration in future dental manpower needs.

In some countries, such as Sweden, the over supply has led to a wasteful under-employment of professional manpower⁵. In Canada, the under-employment may be occurring, although not yet apparent⁶. McDermott and Oles⁷ maintain that there is an excess of dentists in Canada and that this excess is going to gain in importance since the demand is not increasing proportionately. House et al.² projected that the supply of dentists will increase by 40 per cent over the next 20 years, whereas the demand for dental care will increase by less than 3 per cent. Therefore, these authors estimated the demand for dental care to be substantially below the expected growth of available manpower. A previous study by Brodeur et al.⁸ suggested that the situation might be different in Quebec. An analysis of the growth of demand and supply of dental care in Quebec between 1971 and 1985 rev-

ealed that during this period the increase in the dentist population (59 per cent) actually lagged behind that for dental care (76 per cent).

The purpose of the present investigation was to further examine the supply and demand for dental care in Quebec. In particular, the changes in the demand for dental care and in dental manpower between 1985 and 1988 were examined.

Methods

The source used to determine dental manpower and the dentist-population ratio was the register of the Board of the Dentists of the Province of Quebec. The figures for the population of Quebec came from the 1971, 1981 and 1986 Canada census with updatings of the Bureau de la statistique du Québec in 1985 and 1988. The data relative to the demand for dental services came from three sources: Nutrition Canada Survey of 1971, the omnibus pool of the *Institut québécois d'opinion publique* (IQOP) of November 1985 and the omnibus pool of *Stratégie organisation et méthode* (SOM) of December 1988. The Nutrition Canada Survey encompassed a probability sample of 3,302 adults of both sexes from the population of Quebec after a stratification by area, age and sex. The number of adults who participated was 1,559 (47 per cent). The two omnibus pools also used a probability sample of adults of both sexes from the population of Quebec after a stratification by area. All the results were weighted for provincial estimates. The two polls were based on telephone interviews. Eight hundred and forty adults participated (62 per cent in the IQOP polls and 1059 responded (64 per cent) to the SOM polls. There were two questions regarding information on the number of visits to the dentists in the three surveys:

- 1) When did you visit your dentist last?
- 2) How many times did you visit your dentist in the last 12 months?

The data relative to the demand for dental services in U.S. came from the question "How long has it been since your last visit for dental care?" of the National Survey of Oral Health in U.S. Adults⁹. A probability sample after a stratification by area was also used.

Result

The characteristics of the three samples are presented in **Table 1**. The percentages correspond to the distribution of the participants. The characteristics of the 1985 and 1988 samples are comparable with regard to sex, age and area. In the presentation of the results, a weighting system was used in the 1971 sample in order to compensate for the over or under-representation of certain population groups, particularly the over 60-year-old group. The areas are grouped in urban and rural regions and except for those aged 18 to 20 and 21 to 29 years, the ages are grouped in 10-year intervals.

Dental manpower

The number of active licensed dentists increased from 2859 in 1985 to 3089 in 1988. This represented a ratio of 4.32 per 10,000 population or 1: 2315 for 1985 and 4.65 per 10,000 population or 1: 2150 for 1988 (**Fig. 1**). The percent increase from 1971 to 1985 was 59.2 per cent, and 7.6 per cent from 1985 to 1988. On average, the yearly increase from 1971 to 1985 was 4.2 per cent, whereas the yearly increase from 1985 to 1988 was only 2.5 per cent. Therefore the dentist-population ratio continued to increase, but at a slower rate between 1985 and 1988.

Demand for dental services

Knowledge of the time elapsed since the last visit to the dentist made it possible to estimate the percentage of the population seeking regular dental care. The percentage using dental services annually was 46.8 per cent in 1988 compared to 50.8 per cent in 1985, thus showing a decrease of 7.9 per cent in 3 years. The analysis by age group attempted to determine if this decrease in the utilization rate was specific to a definite age group (**Fig. 2**). The 1985 and 1988 curves were almost parallel. The percentage visiting the dentist annually in 1988 was slightly lower than in 1985 for all age groups with the possible exception of those 50-59 years old, in which group the demand

TABLE 1

Descriptive Characteristics of the Samples

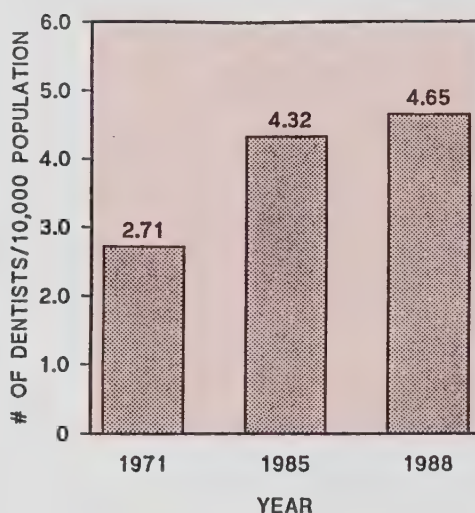
	1971 (N = 1552)** %	1985 (N = 840)** %	1988 (N = 1059)** %
Sex			
Male	44.4	49.4	48.2
Female	55.6	50.6	51.7
Age			
18-20	—	5.4	7.0
21-29*	18.8	27.5	20.2
30-39	15.7	20.9	22.1
40-49	20.7	13.1	17.4
50-59	14.6	15.2	13.9
60+	30.2	18.0	19.4
Region			
Urban (≥ 5 000)	70.7	81.5	79.3
Rural (≥ 5 000)	29.3	18.5	20.7

*For 1971, this age group is 20-29 years.

** These percentages correspond to the distribution of the participants. To compensate for the over-representation of certain population groups, a weighting system was used in presentation of the results. This weighting provides balanced estimates of the population group.

FIGURE 1

Number of Dentists per 10 000 Population Segment for 1971, 1985 and 1988.

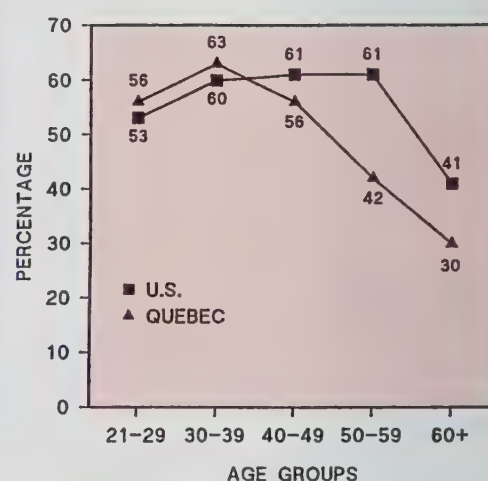


was the same. As in 1985, the tendency to visit the dentist annually decreased with age, following a plateau between 20 and 49 years of age (54 per cent and 51 per cent respectively). A decrease in the percentage of the population visiting the dentist within a one-year period was observed in both samples for those aged 50 and over.

The percentage changes in dental manpower and demand for dental services in 1985 and 1988 are shown in **Fig. 3**. The overall demand had grown by 76.4 per cent from 1971 to 1985

FIGURE 2

Percentage of Adults Visiting the Dentist Annually According to Age in 1985 and 1988.



while the dental manpower had increased at a lesser rate (59.2 per cent). However, while the number of active dentists increased by another 7.6 per cent between 1985 and 1988, the overall demand showed a decline of 7.9 per cent. Moreover, a stabilization of the demand is observed in the participation rate of 5- to 9-year-old children in the program of dental services for children in the Province of Quebec, increasing from 74.9 per cent in 1983 to 78.4 per cent in 1985 and remaining at that level until 1987 (**Table II**).

The results of the second question regarding the number of visits (two or more) to the dentist during the last 12 months allowed assessment of the number of adults receiving various dental treatments and also those who were on a follow-up program requiring two visits per year. The total population of Quebec visiting the dentist two or more times has decreased from 32.7 per cent in 1985 to 26.7 per cent in 1988, a decline of 18.3 per cent (Fig. 4). Although a lower percentage of males as well as females visited the dentist two or more times in 1988 than in 1985, the decline was larger in the female population. A smaller percentage of both the rural and urban populations used the services of a dentist in 1988 compared to 1985. The above results indicated an overall decline in the demand for dental services in 1988.

Finally, an age-specific comparison with the United States showed that the proportion of the Quebec population aged 20 to 49 years who made annual visits to their dentist was similar (Fig. 5), varying between 56 per cent and 63 per cent for those in Quebec and 63 per cent for those in Quebec and from 53 per cent to 61 per cent in the United States. Whereas the loss of interest in dental services occurred only for those aged 60 years and over in the American survey, this decline started at the age of 50 in the Quebec sample. The utilization level of the group aged 60 and over in the American and Quebec surveys being 41 per cent and 30 per cent, respectively.

Discussion

The rate of increase in the number of dentists in Quebec was found to be compatible with the predictions made by House et al². These authors estimated a 40 per cent increase in the supply of dentists over the next 20 years in Canada, with an average annual growth rate of 2 per cent. The results of the present study showed a 7.6 per cent rate of increase in Quebec between 1985 and 1988 with an average yearly increase of 2.5 per cent, compared to a growth rate of 59.2 per cent for 1971-1985, resulting in an average yearly increase of 4.2 per cent. These data confirm the assumption made by Brodeur et al⁸ that there was no assurance that the increase in the number of dentists will remain at the same level in the next few years. The increase in dental manpower in Quebec for the period 1971-1985 was mainly due to a larger number of graduates,

FIGURE 3

Percent Change of Dental Manpower and of Adults Visiting the Dentist Annually.

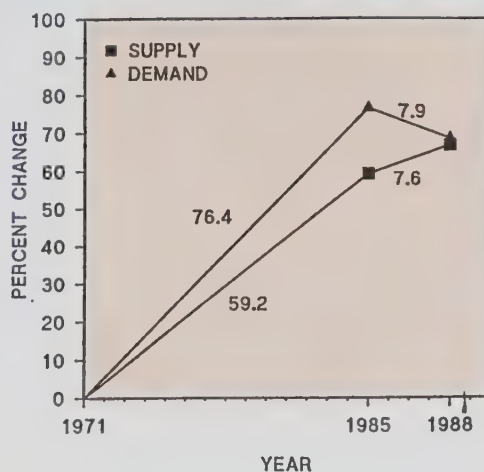


TABLE 2

Participation Rate of Children 5 to 9 Years of Age in the Program of Dental Services for Children of the Province of Quebec, 1983-1988

1983	74.9%
1984	75.9%
1985	78.4%
1986	77.2%
1987	78.1%

resulting from the opening of a new dental school (École de médecine dentaire, Université Laval) and the 60 per cent increase in output from another school (Faculté de médecine dentaire, Université de Montréal). The supply of dentists continued to grow in Quebec after 1985 but at a slower rate. A similar growth rate was observed in the U.S.¹⁰.

The time elapsed since the last dental visit and the number of annual visits made it possible to estimate the size of the population seeking dental care. However, one should keep in mind that the above parameters represented only a fraction of the estimated utilization of services. They did not indicate whether the number of treatments per visit had increased. The results of the present study indicated that the increase in the demand for dental care observed from 1971 to 1985⁸ did not continue at the

FIGURE 4

Percentage of Adults Visiting the Dentist Twice or More annually for 1985 and 1988.

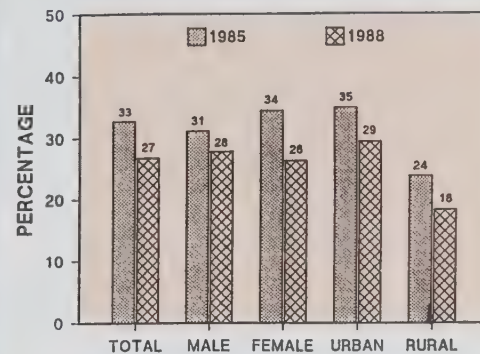
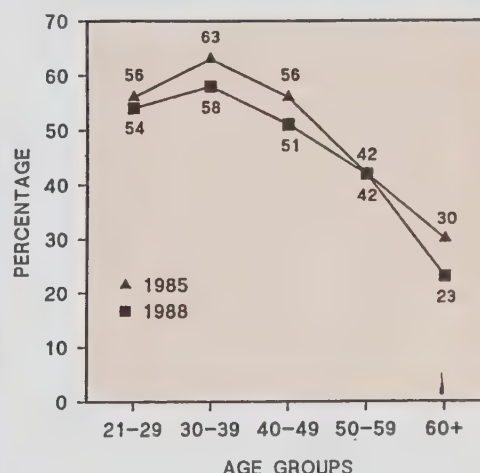


FIGURE 5

Percentage of Quebec and American Adults Visiting the Dentist Annually According to Age in 1985



same rate over the next three years. The percentage of adults seeking dental services in 1988 was 47 per cent compared to 51 per cent in 1985, and 27 per cent of the individuals visited the dentist at least twice a year in 1988 compared to 33 per cent in 1985. Since the time period covered was relatively short and given that the data were available only for two points in time, separated by an interval of three years, it is difficult to draw firm conclusions about trends in the use of dental services over the period in question. Therefore the utilization rate should be monitored closely over the next few years in order to determine more definitely whether the 1988 figure represented the beginning of a decline, a plateau

effect or a blip in an upward trend. Even though, these results did not allow the conclusion that a decline in the demand for dental care occurred, they did indicate that the utilization rate is reaching a plateau in Quebec.

According to House², the factors affecting utilization are economic and social. It is unlikely that major socio-demographic changes occurred in Quebec between 1985 and 1988. Thus, other factors could be responsible for this stabilization, such as lack of information, a low level of interest in dental health, or insufficient funds. Furthermore, according to a 1988 Gallup survey requested by the Canadian Dental Association, 79 per cent of the population of Quebec thought that the cost of dental treatment was unreasonable. One solution could be a greater access to dental care insurance programs. Recent studies,^{11,12} have also suggested that dental insurance stimulates utilization and improves the oral health status of the insured under 35 years of age. Such detailed Canadian research is lacking. However, Lewis⁴ has demonstrated the positive impact of dental insurance on dental utilization, based on the data of the adult Ontario Gallup survey. The latter showed that nearly 82 per cent of the insured population made at least one dental visit over the 1979-80 period. Therefore, in order for a larger percentage of the Quebec population to benefit from regular care and better dental health, emphasis should be placed more on economic incentives than on sensitization programs. The recent educational campaigns conducted by the Ordre des dentistes du Québec did not seem to affect the utilization rate or to motivate more people to seek dental care.

A similar percentage of Quebecers and Americans between the ages of 18 and 40 made annual visits to the dentist in 1985. The percentage of Americans visiting the dentist at least once a year was approximately 50 per cent in 1979 and has remained relatively stable since that time¹³. It appears that demand for dental care in Quebec has reached a plateau and has attained the American level. The same trend was observed in the United States in the late 1970s. The difference in the utilization rate between Quebec and the U.S. populations lies mainly in those 50 years of age and over. According to Lewis⁴, denture patients have fewer visits to the dentist. The higher percentage of edentulous patients in Quebec in this age group could account, at least in

part, for this difference. Secondly, the programs geared to sensitize the Quebec population for better dental care had less influence on the older population: changing the habits of this age group is more difficult.

In summary, one could say that changes in the supply and demand for dental care have occurred in Quebec since 1985. As the number of active dentists continues to grow, albeit at a slower rate, the demand for dental care appears to have reached a plateau. The utilization rate of the Quebec population under age 50 does not really differ from that observed in the United States. In addition to educational campaigns, new dental insurance programs should be implemented to increase the utilization of dental services and to improve dental health.

Dr. Brodeur, Herminé Naccache and **le Dr. Paul Simard** are members of the faculty of Ecole de médecine dentaire, Université Laval, Sainte-Foy, Québec.

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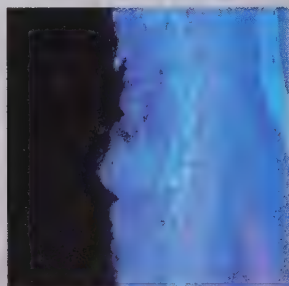
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ABSTRACT

There have been attempts since the early years of this century to produce a biocompatible, biodegradable tissue glue to aid in hemostasis and lessen the need for conventional sutures¹. In the early 1970s, Matras et al² developed a glue to anastomose the severed ends of peripheral nerves, and which was the precursor of the product tested in this trial. Since that time, the product has gained wide acceptance in Europe, with applications in microvascular anastomosis, hemostasis of soft tissue defects, bone sealing and dural sealing.³

SOMMAIRE

Depuis le début du siècle, on essaie de produire une colle tissulaire biocompatible et biodégradable afin de favoriser l'hémostase et d'avoir moins de sutures conventionnelles à faire¹. Au début des années 1970, Matras et al² ont mis au point une colle pour anastomoser les bouts coupés des nerfs périphériques; cette colle est à l'origine du produit testé ici. Depuis ce temps, son usage s'est répandu en Europe et sert à l'anastomose microvasculaire, à l'hémostase des tissus mous, au scellement des os et au scellement dural³.

Introduction

Kerestezi and Wutka⁴ first reported on Tisseel's* use in dental surgery in 1977. In 1982, Wepner et al.⁵ reported its use in 144 dental patients with various bleeding problems. This paper describes the application of Tisseel in patients who required dental surgery while using anticoagulants. A larger number of patients with other bleeding diatheses

were also treated during the same period but will be reported separately.

Mechanism

Tisseel utilizes a two-component system which duplicates the end of the clotting cascade. The first component consists of concentrated thrombin of bovine origin and a solution of calcium chloride. Depending on the clinical requirements, a thrombin solution of either 500 international units per ml or 4 international units per ml. is selected. Use of the higher concentration results in the solidification of the product in approximately 30 seconds. If the lesser concentration is utilized, solidification will take about two minutes. Clinically, this range of setting times is useful as it allows for tissue manipulation prior to setting.

The second half of the two-component fibrin tissue sealant system is derived from pooled human plasma collected in Austria which is fractionated so that only fibrinogen and Factor XIII remain. In addition, an aprotinin solution is incorporated to aid in prevention of early clot lysis in the oral environment. Because of risks of transmission of disease, donors are carefully tested for hepatitis B, HIV, and other blood-borne diseases. Then the product is heat treated to reduce the possibility of virus transmission. To date, there have been no documented cases of hepatitis transmission in over one million patients in Europe and Canada. The product is available in Canada in its lyophilized form and is reconstituted and warmed to 37°C in a specially designed magnetic mixing apparatus.

When mixed and ready for use (approximately 10 minutes), the product is sprayed onto the wound surface via a specially designed device or loaded into a double-chambered disposable syringe apparatus (Duplojet) for injection

onto the surgical field. In our trial, we used an absorbent collagen hemostatic sponge. The product can also be combined with hydroxyapatite crystals or gelfoam.

Research Questions

This was a phase 2 trial (not blinded or placebo-controlled) with all patients receiving Tisseel. Our research questions referred to tolerance of the material, postoperative pain, bleeding problems and the general healing process. Since hospitalization for dental procedures adds considerably to the cost of treatment, differences between out-patients and hospitalized patients were examined. Gender, elevated PT time, and number of operative sites might also have a measurable effect on the healing outcomes.

Methods

From November 1986 to July 1988, 43 patients with various bleeding diatheses were treated in the University of Alberta Hospital's Dental Clinic or in the operating theatre. Seventeen of these patients were anticoagulated and are reported in this paper.

Inclusion criteria were as follows; patients were at least 18 years of age, male or female, currently receiving anticoagulant medication and with a prothrombin time of less than twice normal value on the day of surgery. The dosage of anticoagulant was not adjusted prior to surgery.

Approval was granted from the Faculty of Medicine's Human Ethics Committee prior to beginning the trial. Written consent was then obtained from each patient on an approved form.

Each operative site was followed up independently. Patients were seen on postoperative days 1, 3, 8 and 15. The location of each operative site, procedure, type of suture used, if necessary,

and the use of collagen fleece of other hemostatic method were noted. The amount of intra-operative bleeding was measured on a scale of 0 to 4, with 0 denoting no bleeding and 4 arterial bleeding. Postoperatively, the pain, swelling, bleeding and dehiscence were noted by operative site on this scale. Post-operative control measures were also noted by site.

Results

Table I displays the different diagnoses for the patients in this study. Although the hospitalized group contained no post-cerebral vascular accident or pacemaker patients, the groups were similar for diagnosis. Seven hospitalized and 10 ambulatory patients were treated.

Table II demonstrates that hospitalized patients had been on anticoagulant over three times longer than ambulatory patients. One subject reported being on anticoagulants since 1973, with the majority being more recently started on blood thinners. Reflecting the closer control of anticoagulant level, hospitalized patients had a lower mean prothrombin time than those who were ambulatory. Although the difference was not significant, there were fewer males in the out-patient group than in the hospitalized group.

When these groups were compared, no measurable differences were found for any study parameters listed in the methods section, except in the baseline factor of time anticoagulated. The groups were tested and found to be balanced for age, sex, number of operative sites and types of operative procedures performed (**Table III**). Gelfoam was used in only one case as collagen fleece worked better in conjunction with the fibrin glue. More sites were treated in the hospitalized group but this was not significantly different from the ambulatory group. Most of the treatments for both groups were simple extractions. The use of other hemostatic agents was higher for the hospitalized group, and this reflects the fact that more sites were treated in that group.

Discussion and conclusions

No adverse trends were found regarding healing results in any of the patients tested. In addition, there was no bleeding that had to be retreated.

The product was well tolerated by all patients with no evidence of any aller-

TABLE 1

Diagnoses of Anticoagulation by Group

Diagnosis	Hospital	Ambulatory
Rheumatic heart disease	1	0
Kidney failure/renal dialysis	2	1
Cardiac transplant candidate	1	2
Prosthetic heart valve	2	1
Cardiovascular disease/unknown	1	1
Cerebral vascular accident	0	2
Pacemaker	0	3
Total	7	10

TABLE 2

Demographic and Clinical History by Group

Patient Characteristic	Hospital	Ambulatory
Age (Years)	50.3	54.1
Sex Male/Female	3/4	2/8
Time Anticoagulated (Years)	6.5	2.0*
Prothrombin (Recent/Control)	15/11.5	18.4/11.5
*significant $p < 0.01$		

TABLE 3

Operative Factors by Group

	Hospital	Ambulatory
Number of Sites	4.3 + 1.5	3.0 + 2.3
Extraction Procedures:		
Simple	6	9
Surgical	1	1
Other Hemostatic Agent Used		
None	3	7
Collagen Fleece	4	2
Gelfoam	0	1

gic response. Postoperative pain was not a problem and no patient reported pain beyond the moderate level; there was no difference between the groups depending on their hospitalization status.

Results of this phase 2 trial support the use of Tisseel for dental patients who are anticoagulated and require immediate dental surgery if their PT time is less than twice the normal value. More important, these data suggest that if the patient's overall medical situation permits, routine dental surgery can be performed for this class of dental patient without the necessity of hospitalization to monitor for post-operative bleeding problems.

Clinical experience demonstrated that collagen fleece is the best combination for hemostasis. The rationale is that it

attracts platelets, while gelfoam expands to become a slick gelatinous mass without adherence properties.

Use of this fibrin tissue sealant system in dental surgery is technique sensitive and we recommend following all suggested mixing and usage guidelines. It is also worth noting that the use of a surgical splint is helpful for the first 48 hours postoperatively. In summary, no adverse effects were noted for any of the patients treated and the results compared favorably with conventional methods of management for similar anticoagulated patients.

This paper was presented at the annual meeting of the American Academy of Oral Medicine, Phoenix, Arizona, on May 4, 1989.

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*Tisseel, Immuno Canada Inc., Toronto, Ontario

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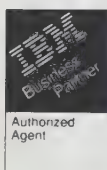
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¹ American Dental Association Council on Dental
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Herpes Simplex Virus Infection: What to look for. What to do!

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ABSTRACT

Herpes simplex virus (HSV) is a ubiquitous microorganism that is highly prevalent in the general population. This prevalence and the oral manifestations put dentists, dental hygienists and dental patients at risk of being accidentally infected with HSV. This brief review highlights some of the basic properties of HSV, its transmission and pathogenesis. As well, common HSV oral infections are reviewed and suggestions are put forward to prevent the accidental transmission of HSV.

SOMMAIRE

Le herpès simplex virus ou herpèsvirus hominis (HVH) est un micro-organisme omniprésent dans le public en général. Sa prévalence et ses manifestations buccales constituent pour le dentiste, l'hygiéniste dentaire et le patient un risque d'infection accidentelle. Dans cet article, on revoit brièvement les propriétés du HVH, la façon dont il se transmet et sa pathogénèse. De plus, on passe en revue les infections buccales les plus communes causées par le HVH et on donne des conseils pour en prévenir la transmission accidentellement.

Introduction

Herpes simplex virus (HSV) (human alpha herpesvirus type 1 and type 2) belongs to the family Herpesviridae which also includes cytomegalovirus (CMV), Epstein-Barr virus (EBV) and varicella zoster virus (VSV). All members within the herpes virus family have the unique property of establishing latency in infected hosts following natural or experimental primary infection.^{1,2} Reactivation stimuli

can reactivate the latent virus to an infectious state and this may result in recurrent disease at the site of the primary infection,³ and repeated recurrences are generally always at the same site.⁴

The Virus

Herpes simplex virus (HSV) is a double-stranded, DNA enveloped virus of which there are two distinct serotypes. HSV type 1 and HSV type 2 are antigenically distinct and indistinguishable under the electron microscope. They share an approximate 50 per cent homology between their DNAs; however, within each serotype, small differences in DNA homologies may exist between different strains of HSV type 1 or HSV type 2. HSV type 1 is more commonly associated with oral-facial lesions while HSV type 2 is more commonly associated with genital infections. However, because of differences in sexual practices, HSV type 1 can be found in genital infections and HSV type 2 in oral infections.

Epidemiology

Man is the only known natural host for herpes simplex viruses. Genital and neonatal infections are more commonly caused by HSV type 2 while most ocular and oral infections are caused by HSV type 1.⁵ HSV infections are endemic worldwide.⁶ By age 14, 70 per cent or greater of children show serologic evidence of HSV type 1 infection. However, the age-specific prevalence rates of HSV type 1 infections appear to be decreasing in Western populations.⁶ Prevalence rates for HSV type 2 correlate with sexual maturity, past sexual activity and promiscuity.^{3,6} By middle age, 90 per cent or greater of the population show serological evidence of past exposure to HSV type 1 and/or HSV type 2.

HSV infections occur year round and are not associated with seasonal variations. The average incubation period is one week; however, variations of 1 to 26 days have been noted.⁶ Transmissions can occur from symptomatic or asymptomatic individuals to susceptible individuals. Direct contact with ulcerative lesions, saliva from infected individuals, direct contact such as kissing, airborne droplets or by common usage of kitchen, bathroom and other common utensils can result in transmission of HSV type 1. Although HSV type 2 may also be transmitted by the previously mentioned vectors, sexual contact is still considered the major route for transmission.

Pathogenesis and Pathology

The pathogenesis of human HSV infections has been extensively reported in the literature.^{1,2,7} During primary infections, multiplication of virus at the periphery results in the uptake of virus by nerve endings innervating the affected area. Following uptake, the virus migrates centripetally to sensory ganglia where latency is established. Latency is maintained for the life of the individual.⁷ At times following the establishment of latency, the latent virus can be reactivated either spontaneously or by reactivation stimuli. Following reactivation the virus is thought to migrate centrifugally to the periphery whereby local multiplication may lead to recurrent disease. Stimuli shown to reactivate the latent virus include physical trauma, sunlight, menstruation, stress and immunosuppression.^{3,8}

Pathologically, lesions consisting of intraepithelial vesicles with epidermal cells showing ballooning degeneration are typical for both primary and recurrent disease. Basal epithelial cells are normally unaffected. Amitotic division

of epidermal cells generally lead to the formation of multinucleated giant cells.⁹ Nuclear and cytoplasmic inclusions are characteristic. Nuclei said to have a ground glass appearance are thought to arise from HSV-altered cells showing chromatin margination and nuclear homogenization. Mononuclear leukocyte infiltration is seen in the dermis and, following rupture of the vesicles, regenerated epithelial cells repair the damaged epithelium.⁹ Pathological changes have been noted⁹ for the central nervous system and major organs of the body where HSV infections have been more systemic.

The following sections describe HSV infections most likely to be encountered in dental practice.

Primary Acute gingivostomatitis

HSV type 1 is most commonly associated with acute gingivostomatitis.¹⁰ Generally, children acquire the infection between the ages of four to six years old. Asymptomatic individuals account for 80-90 per cent of those infected. Symptomatic individuals generally experience fever, malaise and gingivostomatitis. Vesicular lesions of the oral mucosa are typical. Incubation ranges from 2 to 12 days.

Irritability may precede an increase in temperature (38°-40°C). Vesicular oral lesions rupture to form painful ulcerations covered with grayish-white plaques. The ulcers may be present on the tongue, palate, lips and/or buccal mucosa. Clusters of vesicles may coalesce to form larger lesions with uneven borders.³ Generalized erythema occurs near and surrounding the affected area and after, bleeding from the gums may occur. Painful lymphadenopathy is not uncommon. Immunocompromised individuals may also have the esophagus and/or larynx involved. Typically, children refuse to take anything by mouth due to the oral discomfort. At this stage, dehydration and acidosis may occur. In normal individuals, the disease is self-limiting and recovery occurs within 10 to 14 days with complete healing and without scarring.

In dental practice, it is advisable to recognize children who may be actively infected with oral herpes. Children aged four to six years should be examined for the presence of oral lesions indicative of herpes infection. During treatment of infected individuals, care should be taken by the dentist and den-



Fig. 1. Potential sites at which stimuli may act to cause reactivation of latent HSV. Stimuli may act peripherally, directly at the ganglion or at both sites. Reactivation may lead to release of HSV from ganglia, microfoci of infections at the periphery or overt recurrent disease.

tal assistants to ensure that they do not expose cuts, hangnails or any other abrasions, on the hands, to infected material. Following treatment, care should be taken to guarantee that instruments are carefully sterilized and that proper hand washing prevents transmission of infected material to susceptible individuals.

Herpes Labialis (Cold Sores, Fever Blisters)

Herpes Labialis will most likely be the commonest manifestation of herpes virus infection encountered in dental practice. This infection generally results from reactivation of latent virus in the trigeminal ganglia, the site of latency.¹ The infection most commonly occurs at or near the mucocutaneous junction of the lips. Reactivation of latent virus may result in asymptomatic viral shedding, recurrent disease or immediate clearance of the virus by host immune mechanisms before symptomatology or shedding occurs. Factors thought to reactivate latent virus include stress, fever, physical trauma, excessive sunlight, menstruation and immunosuppression.^{10,11} A prodromal period consisting of itching, tingling or burning may precede the development of populous eruptions which quickly develop into clusters of vesicles that ulcerate. Following ulceration, the lesions crust and recovery occurs without residual scarring. Generally, healing time is 10 to 14 days from start to finish. Virus titre are high early

in the infection and decline as crusting progresses.

Again, as with primary acute gingivostomatitis, awareness and recognition of patients with oral, recurrent herpes lesions is essential for preventing spread of virus to the dentist, assistant and even the patients themselves.

Traumatic Herpes

Perhaps one of the most basic infections that has great potential for accidental spread in dental practice is traumatic herpes. In dental procedures, where unprotected hands are involved in invasive and noninvasive techniques, the potential spread of herpes to cuts in the skin, hangnails and abrasions is well recognized. The common manifestation is referred to as herpetic whitlow and is characterized by visual or pustular lesions that develop around fingernail folds. This infection is often very painful, with considerable discomfort which may or may not render the individual unable to work. The infection is self-limiting and usually subsides in 10-14 days.

As is undoubtedly obvious, recognition of this type of infection by health care workers is essential for preventing the accidental transmission of herpes virus to susceptible patients. One might suggest that, in this situation, the infected individual, for the safety of the patient, refrain from oral procedures when infected. Although potentially costly in terms of lost work production, the price for preventing virus transmission is invaluable.

Ocular Herpes

Although not yet a serious problem in the dental field, the potential for increasing occurrence of ocular herpes infections among health care workers may increase with more involved oral procedures. While performing oral procedures, the dentist or hygienist may be susceptible to ejection of patients' saliva containing both bacteria, and possible virus, which can damage the eye.¹²

At present, the leading cause of transmissible blindness in the U.S. is HSV with an estimated 500,000 cases annually.¹³ Classically, HSV type 1 is the causative agent and only one eye is infected. As one might expect, primary infection is more severe than recurrent infection. Follicular conjunctivitis or keratoconjunctivitis with a non supportive preauricular lymphadenopathy may accompany vesicles of the periocular skin.¹³ The corneal surface may be

covered with dendritic (branching) corneal lesions and pseudomembranes may be present on the conjunctiva. Pain, photophobia, tearing and mucoid discharges are common symptoms. Corneal lesions have a duration of three to four weeks while conjunctivitis rarely exceeds three weeks.

Recurrent lesions are similar to those for the primary infection. Lesions may be present on eyelids and the corneal surface. Stromal fibre destruction may lead to blindness, as may a scar tissue.⁹

Treatment

Since it is well recognized that primary infection with HSV generally occurs early in life, is self-limiting in immunocompetent persons and is asymptomatic in the vast majority of cases, there is no definite treatment. However, oral rinsing with warm water or sodium bicarbonate several times a day may relieve some local pain and discomfort. Analgesics and diet modification may also be necessary. Children should be monitored for dehydration.

Treatment of individuals with recurrent oral herpes lesions should be restricted to those individuals who are frequently bothered by recurrent disease. The most successful herpes agent to date is acyclovir, which is a synthetic purine nucleoside analogue of quanosine. It has been found to have specific antiviral activity against HSV type 1 and HSV type 2. For recurrent herpes labialis, 5 per cent acyclovir cream appears to shorten the time necessary for lesions to crust,¹⁴ as well as shorten the duration of lesions.¹⁵

Prevention of infection and cross-contamination

There are several steps that one may take to prevent either transmission of HSV from patient to health worker or from health worker to patient. Where active infections are obvious, measures such as wearing gloves, handwashing and destroying infected material greatly cut down on virus available for transmission.

Protective eyewear will minimize the incidence of ocular herpes. Another measure is to ensure that proper cleaning and sterilization of instruments occur between appointments. Simple washing is generally not enough to ensure removal of all pathogenic microorganisms. Various methods of sterilization include autoclaving, boiling

water, dry heat, ethylene oxide gas, and numerous chemicals. For more extensive reviews of sterilization procedures, interested individuals should consult current literature on sterilization.¹⁶

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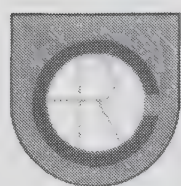
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ROBERT GILMORE (MONTREAL)

The Epidemiology and Natural History of AIDS and HIV Infection

PROFESSOR JENS PINDBORG, (COPENHAGEN)

Oral Problems Related to the Global Occurrence of AIDS

DR. DEBORAH GREENSPAN (SAN FRANCISCO)

Oral Candidiasis Associated with HIV Infection

DR. JOHN GREENSPAN (SAN FRANCISCO)

Viral Disease in Patients with HIV Infection

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Oral Ulceration Associated with HIV Infection

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HIV-Associated Periodontal Disease

DR. JOEL EPSTEIN (VANCOUVER)

Malignant Disease of the Head and Neck in HIV Infection

DR. MORTEN SCHIODT (COPENHAGEN)

Salivary Gland Disease Associated with HIV Infection

DR. JOHN HARDIE (OTTAWA)

Infection Control and Provision of Care: Outline of the Canadian Association Guidelines

PANEL DISCUSSION: *Question from the floor.*

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Localized juvenile periodontitis: A review of the literature

Shirley C. Gelskey, Dip DH, BS, MPH
Vijay K. Pruthi, DDS
Winnipeg, Manitoba.

INTRODUCTION

Localized juvenile periodontitis, formerly known as "periodontosis", is a disease of the periodontium characterized by rapid bilateral alveolar bone loss around the permanent first molars and incisors in otherwise healthy adolescents. The purpose of this article is to describe a comprehensive review of localized juvenile periodontitis. The unique epidemiological, clinical, histological, microbiological and immunological characteristics of the disease and host are discussed, in addition to the impact that these factors have on its successful diagnosis and treatment.

SOMMAIRE

La parodontite juvénile localisée, qu'on appelait auparavant parodontose, est une maladie du parodonte qui se caractérise par une dégénérescence rapide de l'os alvéolaire bilatéral autour des premières molaires et des incisives permanentes chez les adolescents qui jouissent par ailleurs d'une bonne santé. Cet article a pour but de décrire le phénomène au complet en révisant les uniques caractéristiques épidémiologiques, cliniques, histologiques, microbiologiques et immunologiques de cette maladie et de son hôte. De plus, on parlera des conséquences que ces facteurs ont pour pouvoir réussir le diagnostic et le traitement.

Localized Juvenile Periodontitis (LJP) A Distinct Diagnostic Entity

Periodontal disease among adolescents has been well documented over the past 60 years. Gottlieb,¹ in 1928, described "diffuse atrophy of alveolar bone" among youth. The predilection of the disease for permanent first molars and incisors was identified by Wannermacher² in 1938. Through the years, the disease has been termed "parodontosis",³

"periodontosis"⁴ and "deep cementopathy"⁵. In 1950, the American Academy of Periodontology⁶ classified periodontosis as a degenerative disease. The term "juvenile periodontitis" was introduced by Butler, in 1969⁷. He found no evidence of a degenerative process involved with the disease.

Baer⁸, in 1971, outlined the classic clinical criteria for periodontosis, describing a disease of the periodontium occurring in an otherwise healthy adolescent, characterized by rapid loss of alveolar bone around more than one tooth of the permanent dentition; the amount of destruction not being commensurate with the amount of local irritants present. He suggested that the disease occurs in two forms:

- I. Localized, ie., only affecting first molars and incisors,
- II. Generalized, ie., affecting the entire dentition.

Three types of juvenile periodontitis were proposed by Horman and Frandsen in 1979.⁹ Type I: localized to first molars and/or incisors, type II: localized, but involving up to 14 additional teeth, both types occurring in the early-mid teens; and type III: generalized juvenile periodontitis (GJP) which involves more than 14 teeth and is seen in the late teens and early twenties. Saxen and Murtomaa¹⁰ in 1985 suggested that juvenile periodontitis begins as a localized process and, left untreated, develops into a generalized form of the same disease which closely resembles adult periodontitis.

Prevalence of LJP

Over the past two decades, the prevalence of juvenile periodontitis has been estimated at 0.15 per cent in the United States military,¹¹ 0.2 per cent in Bombay,¹² 0.4 per cent in a dental school patient population in the United States,¹³ 0.1 per cent in a British school population,¹⁴ 0.75 per cent in Nigeria,¹⁵ and 0.1 per cent in Switzerland.¹⁶ Juvenile periodontitis affects females more frequently than males, (3:1)¹⁷ (2:1)^{13,18,19,20}. Saxby¹⁴ and

Kronauer et al¹⁶ however, did not find this distinction.

A racial predilection of juvenile periodontitis has been described.^{18,20} Saxby¹⁴ found the prevalence to be 0.02 per cent in Caucasians, 0.2 per cent in Asians, and 0.8 per cent in blacks. When age was a co-factor in analysis, Burmeister¹⁹ found that the racial distinction became insignificant.

Clinical Findings of LJP Alveolar Bone Loss

A characteristic pattern of rapid, bilateral arc-shaped bone loss is seen mesial and distal to the permanent first molars and incisors. Osseous lesions are often vertical, sometimes reaching the periapex.^{8,21} Initially only one proximal surface of the first molar is affected, usually the mesial surface.^{8,22} When allowed to progress, the pattern of bone loss becomes more generalized and horizontal, affecting the buccal and lingual plates and possibly furcations.^{8,10,21,23}

Local Factors

LJP often presents clinically with minimal plaque and calculus, while GJP more frequently displays supra/subgingival plaque and heavy calculus.^{16,23} Typically, plaque scores are lower for patients with LJP than those with moderate-advanced adult periodontitis, but when sites with attachment loss are compared, sites with LJP are found to be equally associated with plaque.¹⁹

Gingival Inflammation and Loss of Periodontal Attachment

Due to a perceived absence of clinical inflammation, Baer⁸ advocated the term, "periodontosis". However, Waerhaug²⁴ identified severe chronic inflammation in the sub-gingival tissues adjacent to plaque in patients affected by LJP, even in the absence of clinical inflammation. Blomlof et al²³ found that sites affected by LJP always bled upon probing.

Mobility and Pathological Migration

Extensive tooth mobility, "wandering" or migration and open proximal contacts in the maxillary incisors and first molars are classic indications of juvenile periodontitis.^{3,5,8,21}

Caries

The degree and distribution of caries has been shown to be significantly less extensive in individuals affected by juvenile periodontitis than in those affected by other forms of periodontal disease or those in periodontal health.²²

Cementopathia

Gottlieb¹ in 1928 first proposed an association between abnormal cementum and periodontal disease. Patients with juvenile periodontitis have been shown to display cementum hypoplasia not seen in periodontally healthy patients or in patients affected by advanced adult periodontitis.²⁵ The degree of bone loss in patients with both LJP and GJP has been correlated to the frequency and extension of such hypoplastic areas.²³ Abnormalities in cementum formation resulting in defective periodontal attachment could account for the unique patterns of bone destruction in juvenile periodontitis.²⁶

Lymph Node Enlargement

A high incidence of regional lymph node enlargement in patients presenting with juvenile periodontitis has been noted.¹⁸ Budtz-Jorgensen et al²⁷ in 1978 suggested that clinically detectable lymphadenopathy among this population could be a secondary consequence of chronic inflammation.

Histopathology of LJP

The histopathology of the juvenile periodontitis lesion consists of an inflammatory infiltrate composed primarily of plasma cells and blast cells with few lymphocytes and macrophages²⁸ and an extensive loss of collagen.²⁹ Gillet and Johnson²⁹ first described bacterial penetration of the periodontium in juvenile periodontitis. *Actinobacillus actinomycetemcomitans* (A.a.) was subsequently identified among the bacteria which invaded the gingival connective tissue affected by LJP.^{30,32}

Microbiology of LJP

Lesions affected by LJP appear to be caused by an infection^{21,33,34} with specific microorganisms in dental

plaque. Listgarten³⁵ in 1976 described the tooth surface of patients with "periodontosis" to be sparsely coated by a simple bacterial population. The microorganism *Actinobacillus actinomycetemcomitans* (A.a.) was identified within this bacterial population.^{36,37}

A.a. is a non-motile, Gram-negative, capnophilic, fermentative coccobacillus. Over the past decade, increasing evidence has associated A.a. with LJP. There are a number of factors that implicate A.a. as the key etiological pathogen of this disease:

1. Histopathologic studies have demonstrated that A.a. invades the gingival connective tissue in LJP.^{29,32}
2. A.a. has been isolated in the subgingival plaque in 90-100 per cent of patients with LJP and occurs infrequently in periodontally healthy sites.^{31-33,38} Up to 60-70 per cent of the subgingival flora in LJP lesions may be comprised of A.a. while this organism is found in low numbers and prevalence in subgingival sites of periodontally healthy patients or in patients with other forms of periodontal disease.³⁴
3. Antibody levels to A.a. in serum, saliva and gingival crevicular fluid are frequently elevated in patients with LJP. Often these antibodies show specificity and are directed to antigens of the A.a. serotype infecting the patient. Periodontally healthy subjects and patients with other forms of periodontal disease have a low prevalence of serum antibodies to A.a.^{31,32,39,40}
4. LJP has been treated successfully by eliminating A.a. from the diseased sites. In subjects where treatment failed to eliminate A.a., continued periodontal breakdown was experienced.^{38,41}
5. A.a. produces a number of noxious agents, all of which appear to have the capability of the aggressive periodontal destruction seen in LJP.⁴² These include a polymorphonuclear leukocyte chemotaxis inhibitory factor which can impair the migration of neutrophils to sites of infection,⁴³ a leukotoxin which kills neutrophils,³⁷ an epitheliotoxin that can assist the microorganism in penetrating gingival epithelial barriers,⁴⁴ a collagenase that can destroy gingival connective tissue,⁴⁵ a fibroblast inhibitory factor,⁴⁶ a bone resorption inducing toxin,⁴⁷ and a potent lipopolysaccharide that may also cause bone resorption.⁴⁸

Two factors may be involved in the familial nature of LJP.

1. An inheritable defect in the immune system which results in an increased susceptibility to A.a. Fifty per cent of the siblings of adolescents with LJP also had significant neutrophil chemotactic defects. In addition, prepubertal siblings who were not affected by clinically detectable LJP had neutrophil chemotactic depression, further supporting the hypothesis that the neutrophil chemotactic defect is genetic in origin and may predispose to LJP.⁶⁴
2. An intrafamilial route of infection where in A.a. can be transferred among family members.³³

Treatment of LJP

Early Therapy

The philosophy of the 1940s propounded that local treatment of periodontosis was of little avail.⁶⁵ Baer,⁶⁶ however, stated that the prognosis for individuals with localized lesions was not entirely hopeless. He focused treatment on occlusal equilibration, orthodontics and splinting of the affected teeth.

Although the prognosis was believed to be poor for most individuals with generalized "periodontosis", the importance was stressed of a well-balanced diet, supplemented with vitamin A, D, C, and B complex since protein deprivation was believed to cause degeneration of attachment apparatus in animals.⁶⁷

Numerous investigators produced an improved clinical status through local treatment of the symptoms of the disease. Typically, treatment involved an adjustment of the occlusion or orthodontic treatment either to promote passive tooth eruption and/or to distribute the occlusal forces more evenly.^{66,68,69} Favorable results, three years after active therapy were seen when three cases of "periodontosis" were treated with a surgical flap procedure and occlusal adjustment.⁶⁸

Autotransplantation of suitable third molars into extraction sites of first molars affected by "periodontosis" achieved clinical improvement when followed up for one to seven years. All transplanted molars continued their root formation, experiencing no pocket formation, mobility, root resorption, ankylosis or necrosis of the pulp.^{70,71}

Clinical response was favorable to surgical procedures which incorporated autogenous bone chips.⁷² A one-year

post-operative clinical evaluation of advanced osseous defects, presenting in 12 cases of LJP and treated surgically with freeze-dried allografts and systemic tetracycline demonstrated complete osseous regeneration in 22 sites, greater than 50 per cent regeneration in 39 sites and less than 50 per cent in only one site.⁷³

Antibiotics: LJP

Baer and Socransky⁷⁴ suggested that adjunctive antibiotics be employed in the treatment of LJP. Others have demonstrated improved clinical status through a combination of local therapy and adjunctive antibiotics.^{32,38,41,75-92}

Additional evidence to support the use of adjunctive antibiotics in the treatment of LJP has come from studies which not only demonstrate clinical improvement, but also display an increased efficacy of local therapy plus systemic antibiotics in terms of suppression or elimination of A.a. from the periodontal pocket.^{38,41,75,77,80,83,84,86,87,89,90,92} A few investigators, producing favorable clinical results through local therapy alone, suggest that adjunctive use of antibiotics is unnecessary.⁹³⁻⁹⁶ Other authors propose that antibiotics alone are effective in the initial control of LJP.^{88,91}

Tetracycline possesses a number of properties which appear to contribute to its effectiveness in the treatment of LJP: 1) It can concentrate in the gingival crevice at levels two to four times greater than in serum;^{97,98} 2) It exhibits collagenase inhibition activity;^{99,100} 3) The bacteria associated with LJP are susceptible to tetracycline¹⁰¹ 4) Tetracycline strongly adsorbs to the tooth surface while retaining its antimicrobial activity for a prolonged period;¹⁰² 5) Tetracycline can inhibit osteoclast mediated bone resorption;¹⁰³ 6) It suppresses A.a. in LJP lesions and may permit the subsequent colonization of the lesions by bacteria less sensitive to tetracycline which may in turn have the potential to suppress the regrowth and pathogenicity of A.a.¹⁰⁴

Numerous studies demonstrate the efficacy of adjunctive tetracycline in the suppression or elimination of A.a. in relation to the treatment of LJP.^{38,74,75,80,81,83,89-91,99,105}

The effectiveness of other antimicrobials in the treatment of LJP has been evaluated. The combination of amoxycillin and metronidazole along with subgingival debridement is effective in eliminating A.a. and improving the clinical status of

patients.⁹² Adjunctive doxycycline,^{41,84} amoxycillin,⁸⁷ minocycline and metronidazole⁸² effectively eliminate A.a. from areas affected by LJP, thus resulting in an improved clinical status.

Limited success is found with the local delivery of iodine solution or tetracycline released from hollow fibres.^{89,106} Results of local treatment are not enhanced by the use of oral penicillin⁹⁸ except at very high concentrations.⁹⁹

Neutrophil Chemotactic Function

The role played by immunomodulators on the enhancement of neutrophil chemotactic function in patients with LJP has been investigated as an additional approach to treatment. Levamisole, an immunostimulatory drug, improves *in vitro* the migratory response of neutrophils in patients with LJP.¹⁰⁷ *In vivo* use of levamisole given systemically to four LJP patients demonstrates effects on lymphocytes; however, neutrophil function is not evaluated.²⁷ Fibronectin may be an agent which could enhance the chemotactic response of neutrophils by affecting their locomotion.¹⁰⁸ Ascorbic acid, serotonin, and carbamylcholine may also enhance the chemotactic response of neutrophils from LJP patients whose function is abnormal.¹⁰⁹ Bestatin increases neutrophil chemotaxis by 174 per cent of the untreated levels.⁵⁰

Other organisms have been identified in elevated numbers in sites affected by LJP including *Capnocytophaga* species and *Eikenella corrodens*;⁴¹ however, they are also found in supragingival flora of most individuals, regardless of the disease state of the periodontium.⁴⁹

Host response in LJP

Recent studies of host response in patients affected by LJP have indicated that most immune functions appear to be normal and that such individuals are generally otherwise healthy. Seventy per cent of this population, however, demonstrate neutrophil chemotactic and phagocytic defects.^{50,51} The neutrophil chemotactic defect in patients affected by LJP represents a reduced ability of the neutrophils to detect and respond to a chemotactic gradient in *in vitro* tests of peripheral blood neutrophils.⁵² The neutrophil chemotactic dysfunction in LJP patients is expressed to a variety of chemotactic agents such as the chemotactic factors released by bacteria

and from the complement system.⁵³ Patients with LJP have abnormal neutrophil locomotion which is demonstrated by altered migration of neutrophils through the gingiva into the gingival sulcus/pocket. This may account for the increased susceptibility of these individuals to periodontal infection.⁵⁴

The chemotactic abnormality of the neutrophil is also characterized by a decrease in the rate of cell migration, while random migration and chemokinesis are normal.^{43,55} Neutrophils and other phagocytic cells are the host's first line of defence against bacteria. A.a. has the ability to combat hosts defences by altering neutrophil response via modulation of surface receptor expression.^{55,56} Microorganisms take advantage of the neutrophil delay and colonize the host. The delay may also cause the activation of the neutrophils' antibacterial effector mechanism in the connective tissue, causing the host's own defence to contribute to the pathogenesis of the disease.⁵⁷

The biochemical aspect of the neutrophil chemotactic abnormality in LJP has shown that the neutrophils demonstrate a reduced number of cell surface receptors for the synthetic polypeptide chemotactic factor, N-formyl-methionylphenylalanine (FMLP); fewer receptors for C5a,⁵⁸ and reduced amounts of the surface glycoprotein, GP-110 which is important in the chemotactic response.⁵⁵

Patients affected by LJP often have elevated total serum IgG levels and sometimes elevated serum IgM levels.⁵⁹ The elevated immunoglobulin levels may be accounted for partly by the elevated antibody levels in these individuals since there is a correlation between anti-*Actinobacillus actinomycetemcomitans* titres and IgG levels in most patients' sera.^{53,60}

Genetics in LJP

LJP tends to occur among members of the same family, suggesting genetic or hereditary factors may have a role in the pathogenesis of the disease.^{8,61-63}

Discussion

Localized juvenile periodontitis (LJP) or "periodontosis" has recently been the focus of extensive periodontal research. The prevalence of LJP does not appear to warrant major dental public health concern; however, the disease provides a simple model of periodontal disease with a specific agent, *Actinobacillus*

actinomycetemcomitans (A.a) implicated in its etiology. As our understanding of LJP increases, so does our awareness of how the following factors may impact on the pathogenesis of periodontal diseases in general: the mechanisms by which A.a. invades the tissues of the periodontium; the capabilities of A.a. to produce several extremely noxious agents; that LJP shows a severe inflammatory infiltrate consisting of large numbers of plasma cells; that LJP patients often have elevated total serum IgG levels and occasionally elevated serum IgM levels; the site specificity of LJP to permanent first molars and incisors; that most hosts affected by LJP exhibit neutrophil chemotactic and phagocytic defects; the presence of minimal clinically detectable plaque, calculus and inflammation in areas affected by LJP; the apparent racial and sex predilection of LJP to blacks and females; the low caries experience in those affected by this disease; LJP's association with abnormalities in the formation of cementum; its genetic or familial nature; and that it has recently been shown to be treated successfully by local mechanical therapy plus adjunctive antibiotics.

The diagnosis of LJP is determined clinically, radiographically and microbiologically. Successful treatment includes clinical resolution of the periodontal lesions by strict compliance with oral hygiene, conservative surgical excision of infected tissues, and the administration of systemic antibiotics such as tetracycline to eliminate the infecting organisms. Therapy should be monitored by means of clinical and radiographic assessment as well as microbiological evaluation to ensure elimination of A.a. from the infected lesions.

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Reprint requests to Professor Gelskey.

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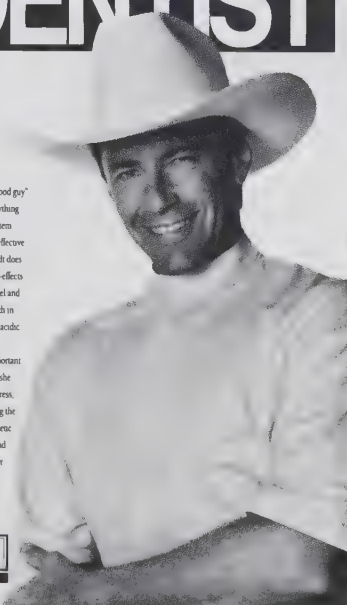
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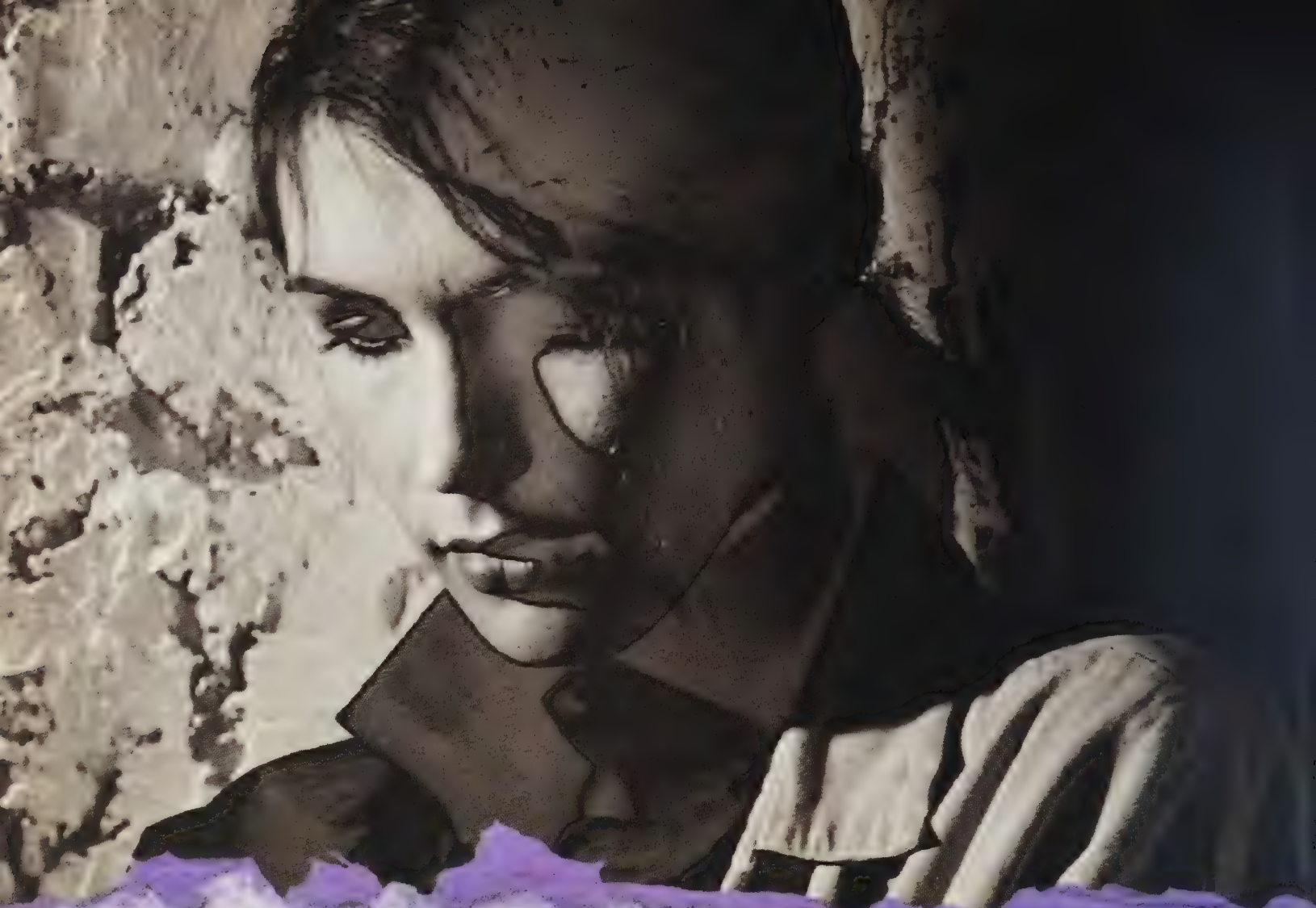
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Announcements

August/Août 1990

August: Annual Congress of International Association of Dental Students in Puerto Rico. Contact: The Secretary, International Association of Dental Students, c/o Fédération dentaire internationale, 64 Wimpole St., London, W1M 8AL, England.

August 24-28: Canadian Dental Association, Annual Convention: Quebec City, Quebec, Canada. (English and French). Please Contact: Dr. Michel Jahjah, General Chairman, CDA Conventions, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6 (613) 523-1770 FAX: (613) 523-7736.

August 24-28: 15th Biennial Conference of the New Zealand Dental Association, Dunedin, New Zealand: For further details, write Conference Secretary, PO Box 647, Dunedin, New Zealand.

August 25: International College of Dentists, Canadian Section — Annual Meeting Convocation: The Chateau Laurier Hotel, Ottawa, Ontario. Editor, N. Murnoe, 203-333 Bayview Ave., Willowdale, Ont. M2K 1G4.

August 25: A meeting of the Canadian Association of Dental Consultants will be held on Saturday August 25, 1990 at the Westin Hotel, Ottawa. All members as well as perspective members are urged to attend. For further information contact, Dr. J. Berman, (613) 234-1595, Ottawa.

August 25-28: Congress of the Association of Dental Education in Europe in Budapest, Hungary. For details, contact: Prof. Jolan Banoczy, Mikszath K ter 5, H-1088 Budapest, Hungary.

August 25-29: Canadian Dental Association, Annual Convention: Ottawa, Ontario, Canada (English and French). Contact: Dr. Michel Jahjah, General Chairman, CDA Conventions, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6. (613) 523-1770 FAX: (613) 523-7736.

August 27: 7:30 to 9:30 a.m., Pierre Fauchard Breakfast, Burgundy Room, Pierre Fauchard Academy, Monday, August 27th. Contact, Dr. Michael Crompton, 567 St. George Street, Moncton, NB. E1E 2B9, or call: (506) 857-2186, (506) 855-4856.

September/Septembre 1990

September 22, 1990: The Alberta Academy of Periodontics presents current concepts and future trends in Periodontics. Speaker, Dr. Timothy Gould. For information contact: Dr. Peter Wooding, 502-8215 — 112 St., Edmonton Alberta, Canada, T6G 2C8

September 28 — 29 and November 30 to December 1: Myo-Tronics Research, Inc., will be holding two-day courses on simplified techniques in fixed reconstruction. The courses, taught by Dr. Robert Jankelson, are approved for 14 CE credit hours by the AGD and Boards of Dental Examiners of California and Florida. To register or for information call MRI Continuing Education at (800) 426-0316.

October/Octobre 1990

October 3-6: Sarajevo, Yugoslavia. The Sixth Yugoslav Congress of Orthodontists, will be held in the UNIS Business Centre Congress Hall, Burgundy Room, Pierre Fauchard Academy located in the Sarajevo city centre. For information contact: Unis/Tours, Congress Dept., 71000 Sarajevo, Trscanska 7, or call: 071/202-072, 202-094. Telefax: 071/513-611.

October 10-11, 1990: Tenth Annual Bristol-Myers Squibb/Mead Johnson Symposium on Nutrition Research. "The Biology of Feast and Famine: Relevance to Eating Disorders" is being organized by the Departments of Nutritional Sciences and Psychiatry, University of Toronto, under a Bristol-Myers Squibb/Mead Johnson unrestricted research grant. For more information call Francine Gingras, Bristol-Myers Squibb, 212/546-4616; or Sharon Padua, Bozell Public Relations, 212/484-7415.

October 10-13: American College of Prosthodontists Meeting — Charleston, SC: For more information contact: Ms. Linda Wallenborn, 1777 NE Loop 410, Suite 904, San Antonio, TX 78217.

October 11: American Academy of the History of Dentistry Meeting — Boston: For information contact: Ms. Aletha A. Kowitz, 211 E Chicago Avenue, Chicago, 60611.

October 11: Academy of Dentistry International Meeting — Boston: For information contact: Dr. Henry J. Sazima, executive director, 5125 MacArthur Blvd, NW, Washington, DC 2006-3315.

October 11-12: The Fourth Annual Bernard Jankelson Memorial Lecture and 1990 Fellowship Convocation will be held in Boston immediately preceding the ADA Annual Meeting. Dr. Joseph Kinselmann of Washington, D.C and Dr. Gerald Murphy of Grand Island, Nebraska will be the featured speakers.

October 12: ICCMO'S 4TH Annual Bernard Jankelson Memorial Lecture and 1990 Fellowship Convocation will be held in Boston immediately preceding the ADA Annual Meeting. Dr. Joseph Kinselmann of Washington, D.C. and Dr. Gerald Murphy of Grand Island, Nebraska will be the featured speakers. A registration fee of \$315 for ICCMO Members (\$375 for Non-members, \$150 for Residents and Auxiliaries) includes the lecture, mini-clinics, "Open Mike" session and a special Writer's Roundtable for authors who seek guidelines and information on preparing articles for scientific publications. For information on registration for the two-day meeting, please contact the ICCMO International Headquarters, 830 Marsh & McLennan Building, Seattle, WA 98101, or call 1 (800) 446-1763.

October 17-21: American Society of Dentistry for Children — Meeting: For more information contact: Ms. Carol A. Teuscher, 211 E Chicago Avenue, Suite 1430, Chicago, 60611.

October 28-30: The Annual Meeting of the American Academy of Maxillofacial Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina. U.S.A. Guests fees for technicians and assistants are \$50 and for all others, \$150. For more information contact Dr. Nikzad S. Javid, Chairman,

International Relations Committee of the American Academy of Maxillofacial Prosthodontics, University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida 32610-0435 or Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, Ga. 30912-0200.

October 31-November 3: The Annual Meeting of the American College of Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. Guest fees for technicians and assistants are \$50 and for all others, \$150. For more information contact Dr. Nikzad S. Javid, Chairman, International Relations Committee of the American Academy of Maxillofacial Prosthodontics, University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida 32610-0435 or Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, Ga. 30912-0200.

November/Novembre 1990

November 2-3: The Ontario Dental Association Symposium '90 — "Bridging the Gap", to be held in Toronto: For information contact: Professional Development, The Ontario Dental Association, 234 St. George Street, Toronto, Ontario, M5R 9Z9 or call the ODA at (416) 922-3900.

November 27-30: XIIth International Dental Film and Video Festival in conjunction with the International Congress of the French Dental Association in Paris, France. For information, contact: Dr. M. Dolovici, Secrétaire Général du Festival; 92, avenue de Wagram, 75017 Paris, France. Téléphone 33 1 42.27.89.00.

January/Janvier 1991

January 20-27, 1991: The Barbados Dental Association is hosting its Third Annual Dental Mid-Winter Convention plus Maxillofacial and Craniofacial Surgery Symposium. For further information contact: Alison Hoad (Mrs.), Travel Connection, 3rd Floor Cave Shepherd & Co. Ltd., Broad Street, Bridgetown, Barbados, Telephone: (809) 431-2060, Fax. (EO9) 431-2067.

September/Septembre 1991

September 27-30, 1991: 13th Congress of the International Association of Dentistry for Children to be held at the Kyoto International Conference Hall, Kyoto, Japan. For information contact the Secretariat, 13th Congress of the International Association of Dentistry for Children, c/o Japan Convention Services, Inc., Sumitomo Seimei Midotsuji Bldg., 4-14-3, Nishitemma, Kita-ku, Osaka 530, Japan.



Faculty of Dentistry University of Toronto **ENDODONTICS**

The Faculty of Dentistry, University of Toronto, invites applicants for a full-time, tenured/stream position as **Head of Endodontics**. Applicants must hold an advanced degree, be Board eligible and have significant clinical/research experience in Endodontics.

Current responsibilities include supervision of the undergraduate program, planning and direction of continuing education courses, and a commitment to promote research and other scholarly activities. Future responsibilities include the establishment and direction of a post-graduate specialty program in Endodontics. Academic rank and salary will be commensurate with qualifications and experience. Private practice privileges are permitted 1 day per week.

In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and/or permanent residents. The University of Toronto is an equal opportunity employer.

Application letters, accompanied by a detailed *curriculum vitae*, should be sent by November 15, 1990 to:

Dr Richard P. Ellen
Professor and Head of Periodontics
Chairperson, Search Committee
Faculty of Dentistry
University of Toronto

124 Edward Street, Toronto, Ontario, H5G 1G6

FELLOWSHIPS IN GERONTOLOGICAL HEALTH RESEARCH

Up to two Fellowships per year are to be awarded to Canadian citizens and permanent residents starting in July 1991 for training in gerontological health research. Fellows must be enrolled in a Master of Science or Doctor of Philosophy graduate program or equivalent approved activities in the Faculty of Health Sciences at McMaster University.

Eligibility criteria for candidates are as follows:

Physicians, nurses, pharmacists, physiotherapists and occupational therapists, social workers, or others who:

- 1) are fully trained in their specific discipline and have experience in gerontological health care.
- 2) have the credentials to pursue an academic career in health care for elderly persons with a strong research component.
- 3) are able to identify an acceptable faculty member at McMaster willing to act as research supervisor.

Each Fellow will commit his/her time fully to research training and related activities at McMaster University. The length of the Fellowship is negotiable to a maximum of two years.

Stipends will depend on qualifications and experience and will be similar to those offered by national funding agencies.

*Deadline for application for the
Fellowships beginning July 1991 is:*

February 15, 1991

To obtain an application form write to:

Fellowship Committee
The R. Samuel McLaughlin Centre
for Gerontological Health Research
McMaster University
Faculty of Health Sciences
P.O. Box 2000, Station A
Hamilton, Ontario L8N 3Z5

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TOWN OF MACKLIN, SASKATCHEWAN

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1. Established practice — Dentist retired after 30-year tenure.
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1. Progressive town with good infrastructure and recreation facilities.
2. Population — 1130.
3. Hospital district — 3500 to 4000.
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For more information or applications contact:

Ernest W. Unick, Mayor
Box 69
Macklin, Saskatchewan, S0L 2C0
Phone: 753-2484 or 753-2480



Faculty of Dentistry University of Toronto **SYMPOSIUM** **GERIATRIC DENTISTRY**

A 2 day Symposium and Workshop hosted by the Canadian Academy of Periodontology and the Department of Periodontics, University of Toronto.

Location: Faculty of Medicine Auditorium,
University of Toronto
101 College Street,
Toronto.

Time: 8:30 — 5:00 p.m. May 10 & 11, 1991

Contact: Jennifer White, Continuing Dental Education, Faculty of Dentistry, 416-979-4503.
Call to register or for more information.

Tuition: \$350.00

On the program we have assembled some of the most prominent leaders in the field of dentistry for older adults. The aim of the symposium is to yield up to date information and advice which would be of immediate use to health care providers, educators and policy makers and to identify new directions regarding research and action.

We invite you to participate and trust you will find the symposium stimulating, challenging and applicable.

Offices and Practices

BRITISH COLUMBIA—Central Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472.

BRITISH COLUMBIA—Duncan: One of the fastest-growing areas of B.C. 15-year-old general practice. Large waiting room. Consult room. 3 Ops., 4th plumbed with G.E. Panelips. Six years on computer. N₂O₂. Downtown location, 40 minutes from Victoria. Call (604) 748-3687 weekdays, evenings.

BRITISH COLUMBIA—Parksville: Parksville, B.C. needs a dentist. Set up practice in this fast-growing city on the East Coast of Vancouver Island. Professional building under construction. Join 8 family physicians, specialists, pharmacy, laboratory, etc. Call Dr. Graham White any evening after 7:30. (604) 248-9203.

BRITISH COLUMBIA — Surrey: Well-established, recently-renovated office for sale in Surrey, B.C., 25 minutes from Vancouver. Present doctor and staff willing to stay on to ensure smooth transition. \$250+ plus gross with low overhead. Please call Bus.: (604) 590-2522 or Res.: (604) 594-9630.

(07-01/10)

BRITISH COLUMBIA — Victoria: well-established family practice for sale, located in a beautiful suburb of Victoria. Practice has a high gross-low overhead with a comfortable 4-day work week. Owner planning an early retirement for health reasons. This practice is located in the heart of some of the best fishing, sailing, golfing, and skiing in the world with a mild year-round climate. Please call: (604) 598-0809

(07-03/10)

BRITISH COLUMBIA—Vancouver: Enjoy the great West Coast lifestyle! Very busy, growing family practice for sale. High gross, 28-hour work week, shared office for great net. 3 modern, equipped operatories, with ceiling tv's, Exan computer system for 5 years. Not inexpensive, but worth it! Serious calls only please. (604) 494-4303.

BRITISH COLUMBIA—Vancouver Island: Well-established and growing family practice for sale in "booming", beautiful Campbell River, the "Salmon Fishing Capital", with consistently mild temperatures and excellent half-hour flight connections to Vancouver. This progressive, modern, equipped 800 sq. ft. — 2 Ops, eight-window practice, provides lots of C & B, good gross and low overhead. Will sell for half of last year's gross. Phone (604) 287-4016.

BRITISH COLUMBIA—Victoria and Gulf Islands: Something different. 2 days a week in a children's hospital in Victoria. One day on each of two beautiful Gulf Islands. Great life style, low overhead, interesting work at a reasonable pace. Good gross. Call evenings, (604) 652-4970.

ALBERTA — Edmonton: Practice for sale, in downtown executive office tower. Beautifully decorated, professional clientele, with an average monthly gross of \$30,000. Dentist is going back to school. For information please call: (403) 423-0483.

(07-13/08)

ALBERTA—Edmonton: Practice for Sale. Excellent opportunity for established dentists or new graduates. Modern, 5-operator general practice located in downtown professional building. Phone (403) 422-2783 (days), (403) 467-6887 (after 6 pm).

ALBERTA—Fort McMurray: Reduce office costs while on holidays. LOCUM LOCATORS can supply replacement dentist. (403) 791-7799, 3-101 Signal Road, Fort McMurray, Alberta T9H 4N6.

SASKATCHEWAN: One of the largest family practices in the province, for sale or associateship leading to purchase, in medium-sized city; 6 operatories, with 4 x-rays and panelipse. Very large patient base. Anxious for action. Call CDA (613) 523-1770 ext. 230 for information.

SASKATCHEWAN: Very busy, family-oriented practice for sale or associateship leading to purchase in small Saskatchewan city. Four fully-equipped operatories, including panelipse. Large patient base makes it suitable for 2 new graduates or 1 experienced dentist. Very reasonable selling price. Reply to CDA Box 2420.

SASKATCHEWAN: Practice for sale. Large rural Saskatchewan practice for sale. Buyer to take over lease as purchase price. Excellent opportunity. Please write CDA # 2483.

ONTARIO — Etobicoke: FOR SALE. Long-established solo dental practice, very busy. Excellent opportunity for the right person. Owner is retiring. Please call (416) 845-3114.

(07-04/10)

ONTARIO — Hamilton: General practice requires a full-time associate with plans to purchase. Located on a public transit in a modern medical complex. Good lease, 1200 sq. ft. Three fully-equipped ops., fiber optics, panelipse, auto-developer, etc. Presently 4 days a week, plus hygienist 4 days a week, plus associate 2 days a week. 1700 active patients. An excellent opportunity for the person who wishes to assume a full-time workload in a well-established practice. Present owner retiring due to health (arthritis). Please reply CDA, Box #2493.

(07-02/10)

ONTARIO—Kingston Suburb/Amherstview: For sale: Well-established general practice. Ground floor, 1200 square feet, four operatories fully-equipped. Rapidly growing and expanding community. Owner is willing to associate for two and a half days a week. Please call: (613) 389-0538.

ONTARIO — Southwestern: Busy, established, family practice for sale in small town near Lake Huron. Modern 30' x 50' building, air conditioned, two well-equipped operatories. Reception and business areas, lab, kitchen, bathroom, private office and staff room (or third operatory). Very competent, well-trained staff available with practice. Excellent income, low overhead. Please call (519) 482-5864.

(07-17/10)

ONTARIO—Toronto: ORTHODONTIST required for a largely adult downtown orthodontic practice. Very pleasant environment. Call Dr. Peter Gold, business (416) 928-9529, or home (416) 927-1796.

NEW BRUNSWICK—Moncton: Busy preventive general practice seeking a personable associate with a full range of clinical & patient communication skills. Talented, self-motivated individual will have excellent income and serious partnership opportunity. Please contact Dr. Fenton Smith office: (506) 859-6839 or res.: (506) 383-9032.

Associateships Available

NORTH WEST TERRITORIES — Yellowknife: Family practice requires an associate. Full book available in a busy practice located in a small northern town. Please send a resume to Box 2615, Yellowknife, N.W.T., X1A 2P9

(07-08/10)

BRITISH COLUMBIA: Busy practice in Central British Columbia, requires an associate to start October 1990. We have a modern facility, with Panorax, hygienist and a full support staff. We are seeking an enthusiastic and caring dentist to join this practice. Would suit a new graduate as well as an experienced dentist. Please call: (604) 583-6662.

(07-05/10)

BRITISH COLUMBIA—Chilliwack:

Associateship with view to partnership available to dentist committed to continuing education and excellence in patient care. Busy practice located one hour east of Vancouver in beautiful Fraser Valley. Area offers skiing, hiking, boating and mild climate. Present associate returning to school after having busy practice for 3½ years. For further information, contact Dr. Michael Thomas, 102-45625 Hodgins Ave, Chilliwack BC V2P 1P2 or call (604) 792-0021 (office) or (604) 795-9818 (residence).

BRITISH COLUMBIA—Penticton: Full-time associate needed to assume patient load of departing associate July 1, 1990. Exceptional remuneration and opportunity for future ownership, with own associate, in a busy, progressive, and well-established practice. Call (604) 492-6844.

ALBERTA: Associate in vacationland Alberta. Excellent terms in very busy practice. Call (403) 849-2233 or (403) 849-4626.

ALBERTA — Calgary: Well-established female dentist in private practice requires an associate, leading towards partnership, in an ultra-modern office in prime location. Excellent opportunity for a responsible, caring dentist. Part-time hours negotiable. Please call: (403) 273-7666, Memorial Square Dental Clinic.

(07-06/08)

ONTARIO—Belleville: ASSOCIATE REQUIRED, full-time, for Belleville area offices. Progressive, preventive-oriented family practice. Bright, modern clinic facilities with excellent staff. Buy-in possibilities. Please call: (613) 466-2777, days or (613) 967-1016, evenings and weekends.

ONTARIO—Hamilton/Mississauga: Periodontist looking for part-time

associateship in Hamilton to Mississauga area. Specialist or large progressive general practice preferred. Please reply to CDA Box #2491.

ONTARIO—Leamington: Associateship leading to ownership. We require a special person to join our rapidly expanding general dentistry practice in a recently completed, state-of-the-art facility. This individual must believe in clinical excellence, in the value of a team approach and in the importance of on-going continuing education. A full-time position is available immediately. If you are seeking a challenging and rewarding future in dentistry, please call (519) 322-2866 and ask for Lynn.

ONTARIO—Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent opportunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq ft. Modern facilities in professional walk-in medical-dental. Positions available June 1990. Call: (416) 452-7111.

ONTARIO—Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60 per cent associate percentage offered. Call (705) 522-4252.

QUEBEC — Montreal: Experienced Paedodontist seeks hospital position in Canada or international organization. Please write Dr. M. Marche, 3462 Cuvillier, Montreal, H1W 3B2, Québec.

(07-16/10)

NEW BRUNSWICK — Bathurst: Busy, established family practice for sale. Newly renovated office, 30 new patients per month with strong recall base. Owner leaving area and willing to negotiate price.

(07-14/11)

Auxiliaries

BRITISH COLUMBIA—Abbotsford: HYGIENIST WANTED Full-time hygienist required for busy practice in Abbotsford, British Columbia (one hour east of downtown Vancouver). Applicants must be career minded. Being a "team-player" with above average verbal skills essential for this position. Contact: Mr. M. Motani (604) 852-8487 (collect).

ONTARIO — Toronto: Periodontist required for busy periodontal office. Associateship leading to partnership. Please write CDA BOX 2492

(07-07/10)

Opportunities Available

BRITISH COLUMBIA—Kootenay: CERTIFIED DENTAL HYGIENIST wanted in southern British Columbia, Kootenay. Full-time or part-time. Reply to CDA Box #2482.

BRITISH COLUMBIA—Nakusp: Ideal starter or retirement practice in beautiful Nakusp. Great life-style and low overhead. Call evenings (604) 265-4647.

BRITISH COLUMBIA—Prince George: Enjoy the great outdoors of the northern interior! Female dentist with 5 years experience in growing, general, family-oriented practice has an opening in a modern, computerized office for someone seeking a long-term arrangement with possibility of future buy-in. Reply to CDA Box 2479.

BRITISH COLUMBIA — VANCOUVER Oakridge: An excellent opportunity is available immediately for an experienced practitioner who would welcome a chance to become part of a large and progressive dental group. This is a general practice with a significant crown and bridge component and an efficient recall program. Our office is

computerized and staffed by experienced competent personnel. A number of the patients are Japanese speaking and a command of that language would be an added asset. Please contact Dr. Allan or Dr. Stich at (604) 325-8232.

(07-12/08)

ALBERTA: Practice for sale. Alberta dental practice for sale. Very busy practice. Dentist retiring for medical reasons. Call (403) 849-2233 or (403) 849-4626.

ALBERTA—Calgary: Excellent opportunity for a dentist to purchase a large, thriving practice in an exceptional recreational area. If you enjoy a partnership environment, excellent income potential, and good retirement benefits, please call (403) 289-3746.

ONTARIO—Belleville: ASSOCIATE REQUIRED, full-time, for Belleville area offices. Progressive, preventive-oriented family practice. Bright, modern clinic facilities with excellent staff. Buy-in possibilities. Please call: (613) 466-2777, days or (613) 967-1016, evenings and weekends.

ONTARIO—New Liskeard: SALARIED DENTIST. The Timiskaming Health Unit requires to work in Children's Mobile Treatment Program. Salary: \$75,000-\$78,000 annually. Location: based in New Liskeard with travel within the Timiskaming District. Good Fringe Benefits! Please apply to: Dr. W.M. Coulby, D.D.S., D.D.P.H., Director of Dental Services, Postal Bag 2012, Timmins, Ontario, P4N 8B7, phone (705) 267-1181.

ONTARIO—Niagara: ENDODONTIST, PROSTHODONTIST. Large, modern specialist's office in St. Catharines has space available for a dedicated Endodontist, Prosthodontist or other compatible dental specialist. Excellent regional access to all parts of this 500,000 population underserved area. Opportunity for full- or part-time associate. Lease or buy-in potential. Please call (416) 687-3636.

ONTARIO—North Toronto: Position available immediately for a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426.

ONTARIO — OTTAWA: FOR SALE. Classic Car — 1970 Mercedes/ 270 S.L. convertible with hard top. Excellent condition. Please call: (613) 238-4444, days or (613) 748-7777, evenings and ask for Mr. Cohen.

(07-09/08)

ONTARIO. Toronto: ASSOCIATESHIP REQUIRED: In or north of Metro Toronto. Please Call (416) 661-4035.

(07-19/18)

ONTARIO — Ottawa area: EXCELLENT OPPORTUNITY. Residential town of 3,500 people, 25 minutes from downtown Ottawa requires a full-time dentist to establish a family dental practice. Premises will be provided at exceptional rates. For more information please contact Jim Campbell, (613) 443-5683.

(07-16/08)

QUEBEC — Mont Ste. Marie: PROPERTY FOR SALE. Lake front property, in Mont Ste. Marie, P.Q. Beautiful water frontage; clear winter access, 8 minutes from ski hill. Please call: (613) 238-4444, days or (613) 748-7777, evenings and ask for M. Cohen.

(07-10/08)

NEWFOUNDLAND—Gros Morne National Park: For sale, lease or for associateship. Thriving practice in beautiful park setting. Two fully equipped operatories. Owner staying in area and willing to work part-time or cover for vacations. Phone (709) 458-2111 (O) or (709) 458-2147, Dr. Marina Sexton.

Latin, Spanish, English, French, Greek, etc. clientele. Owner may stay to introduce buyer. Please reply to CDA Box 2494.

(07-18/10)

BRITISH COLUMBIA—Whistler: If you are planning a summer holiday don't miss this opportunity. \$700.00/week in scenic Whistler for a fully equipped new house. Sleeps to 6 to 8. Lots of summer fun hiking, biking, golf, tennis, fishing, swimming, etc. Also call now for next winter's ski season. For reservation call (514) 562-8255.

Equipment

QUEBEC — Montreal: Dental clinic and laboratory for sale. 2 operatories. Private parking with or without building. Front metro. Gross over \$200,000.

Vacation Rentals

BRITISH COLUMBIA—Whistler/Blackcomb: Walk to village and lift from my super 3 bedroom + loft chalet! Stunning view, fully-equipped. Sleeps eight comfortably. \$2000 per week. Call Dr. David Speirs (604) 874-3404.

BRITISH COLUMBIA—Whistler: Three-to-four-bedroom townhouse in Nordic Estates. Three baths, Jacuzzi tub fully-furnished with deck and barbecue. Available for nightly, weekly or monthly rental. Please call, Dr. Ed Murdock, (604) 736-5850 or Dr. Ken Phillips, (604) 433-5756.

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*"New Restorative Concepts:
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Posterior Restorations"*

with

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(Former chairman of the department
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*Day 1: Etching of dentin —
here to stay or gone tomorrow?*

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direct or indirect?*

**For Information call:
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(312) 440-2726**



(acyclovir)
ZOVIRAX OINTMENT 5% (4 g and 15 g tubes)

INDICATIONS AND CLINICAL USE: ZOVIRAX Ointment 5% is indicated for the management of initial episodes of genital herpes simplex infections. It is also indicated in the management of nonlife-threatening cutaneous herpes simplex virus infections in immunocompromised patients. The prophylactic use of this preparation has not been established.

In genital herpes, appropriate examinations should be performed to rule out other sexually transmitted diseases.

These indications are based on the results of a number of double-blind, placebo-controlled studies which examined changes in virus excretion, healing of lesions and relief of pain. Because of the wide biological variations inherent in herpes simplex infections, the following summary is presented merely to illustrate the spectrum of responses observed to date. As in the treatment of any infectious disease, the best response may be expected when therapy is begun at the earliest possible moment.

In immunocompromised patients, 93% were virus negative after 5 days of topical ZOVIRAX therapy whereas only 35% of placebo recipients were virus negative at the same time.

In patients with herpes labialis, there was a significantly greater decrease in the amount of virus excreted after one day of therapy in those receiving ZOVIRAX within 8 hours of the onset of cold sores when compared to identically treated placebo patients.

Because complete re-epithelialization of herpes-disrupted integument necessitates recruitment of several complex repair mechanisms, the physician should be aware that the disappearance of visible lesions is somewhat variable and will occur later than the cessation of virus shedding. All immunocompromised patients who received topical ZOVIRAX had healed their lesions 23 days after the initiation of a 10 day course of therapy. 75% of placebo patients had healed lesions at that point. Some placebo patients continued to have visible lesions for more than 30 days.

Pain associated with herpes infections is highly variable in frequency and intensity. One hundred percent of the ZOVIRAX-treated immunocompromised patients were pain-free by day 23 versus 70% of placebo-treated patients.

Whereas cutaneous lesions associated with herpes simplex infections are often pathognomonic, Tzanck smears prepared from lesion exudate or scrapings may assist in the diagnosis. Positive cultures for herpes simplex virus offer the only absolute means for confirmation of the diagnosis.

CONTRAINDICATIONS: ZOVIRAX Ointment 5% is contraindicated for patients who develop hypersensitivity or chemical intolerance to any of the components of the formulation, such as polyethylene-glycol.

WARNINGS: ZOVIRAX Ointment 5% is intended for topical use only and should not be used in the eye or on mucous membranes.

PRECAUTIONS: The recommended dosage, frequency of application and duration of treatment of ZOVIRAX Ointment 5% should not be exceeded.

It is not known whether acyclovir is excreted in human milk.

Because many drugs are excreted in human milk, caution should be exercised when ZOVIRAX is administered to a nursing mother.

ZOVIRAX Ointment 5% should be used during pregnancy only if the physician feels the benefit will outweigh the possible harm to the fetus.

Safety of use of ZOVIRAX Ointment 5% in children has not been established.

There exist no data, at this time, which demonstrate that the use of ZOVIRAX Ointment 5% will prevent transmission of infection to other persons.

Since most cutaneous herpes simplex virus infections result from reactivation of latent virus, it is unlikely that ZOVIRAX Ointment 5% will prevent recurrence of infections when applied in the absence of signs and symptoms. ZOVIRAX Ointment 5% should not be applied in an attempt to prevent recurrences; application should commence only at the earliest prodromal sign of disease onset.

Although clinically significant viral resistance associated with the use of ZOVIRAX Ointment 5% has not been observed, this possibility exists.

ADVERSE REACTIONS: Because ulcerated genital lesions are characteristically tender and sensitive to any contact or manipulation, patients may experience discomfort upon application of ointment. In the controlled clinical trials, mild pain (including transient burning and stinging) was reported by 103 (28.3%) of 364 patients treated with ZOVIRAX Ointment 5% and by 115 (31.1%) of 370 patients treated with placebo; treatment was discontinued in 2 of these patients. Other local reactions among acyclovir-treated patients included pruritus in 15 (4.1%), rash in 1 (0.3%) and vulvitis in 1 (0.3%). Among the placebo-treated patients, pruritus was reported by 17 (4.6%) and rash by 1 (0.3%).

In all studies, there was no significant difference between the drug and placebo group in the rate or type of reported adverse reactions.

SYMPTOMS AND TREATMENT OF OVERDOSAGE: Overdosage by topical application of ZOVIRAX Ointment 5% is unlikely because of limited transcutaneous absorption.

DOSAGE AND ADMINISTRATION: Apply ZOVIRAX Ointment 5% liberally to the affected area 4 to 6 times daily for up to 10 days. A sufficient quantity of ointment should be applied to adequately cover all lesions. A finger cot or rubber glove should be used while applying ZOVIRAX in order to prevent:

- (1) autoinoculation of other body sites or
- (2) transmission of infection to other persons.

Therapy should be initiated as early as possible following onset of signs and symptoms.

AVAILABILITY: ZOVIRAX Ointment 5% is available in tubes of 4 g and 15 g. Each gram contains 50 mg acyclovir in a polyethylene-glycol base. ZOVIRAX Ointment 5% is for topical administration.

Product Monograph available on request.

Reference:

1. Whitley RJ, Levin M, Barton N, et al. Infections caused by herpes simplex virus in the immunocompromised host: Natural history and topical acyclovir therapy. *J Infect Dis* 1984;150:323-329.



*Trade Mark
ZOV-8906



WELLCOME MEDICAL DIVISION
BURROUGHS WELLCOME INC
KIRKLAND, QUE

Mired In Myths and Misconceptions?

The motivation for my writing this column is prompted by the letter published in this space, in the May 1990 CDA Journal by Dr. Hugh MacKay.

Dr. MacKay's statements once again illustrate the blind obedience some of our very capable dental practitioners still follow regarding the Branemark system of endosteal implants. Although the dental profession and the public owe a tremendous debt of gratitude to Professor Branemark for his seminal work in developing the concepts and precepts of osseointegration and dental implantology, let us not stay mired in certain myths and misconceptions perpetuated primarily by the commercial purveyor of the Branemark fixture and those in academic circles who have undertaken "research projects" funded by said commercial purveyor.

Dr. MacKay makes several erroneous statements either due to extreme bias or a simple lack of correct information. He states... "osseointegration is proven for only this one system." This statement is absurd. There is a plethora of research articles in the literature that illustrate the achievement of osseointegration in several implant systems other than Branemark.

He also states that manufacturing specifications are as "proven as anything in dentistry ever has been". In fact, a 1987 metallurgical report, funded by Nobelpharma itself, concluded that Branemark implant surfaces... "are not metallurgically satisfactory and can detract from suitability of the implants for service.

(Taussig report #4305-1, August 27, 1987)

Dr. MacKay castigates the CDA Journal for the content of a published article that equated the success potential of other implant systems with Branemark's. He then criticizes Health and Welfare Canada for giving notice of compliance... "to three other brands of implants that have no published clinical trial data."

The CDA Journal article was based on a synthesis of conclusions drawn following a symposium on osseointegrated implants wherein several researchers and experienced clinicians participated. Does Dr. MacKay's admonition mean we must only publish articles that satisfy Branemark acolytes?

Is Dr. MacKay aware of the very stringent demands the Health Protection Branch of Environment Canada places on dental implant manufacturers before compliance is granted? This includes clinical trials of which there is published data on several other implant systems including Core-Vent, IMZ and Integral.

Dr. MacKay also states... "people at our universities are competent to make decisions about the adequacy and validity of clinical data." He is correct but does he mean only those universities that have a bias for the Branemark system? What of the Harvard School of Dental Medicine that utilizes Branemark and Core-Vent. Or Tufts University that has a penchant for the I.M.Z. implant. The University of Western Ontario and the University of Montreal utilize the Core-Vent implant system and Louisiana State dental faculty uses the Integral implant system... and I could go on.

Lastly, I would point out to Dr. MacKay the conclusions of the U.S. National Institute of Health Implant Consensus Conference (Washington, 1988). This gave no more credence to the Branemark clinical studies than to studies presented on other systems, calling them all retrospective "case series studies."

Certainly we must stay wary of any and all new aspects of dental treatment and products but let us stay educated and objective in our approach to research, treatment and the evaluation of rhetoric from manufacturers.

Jack G. Zosky, D.D.S., F.R.C.D. (C)
Toronto, Ontario.



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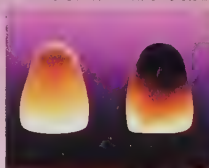
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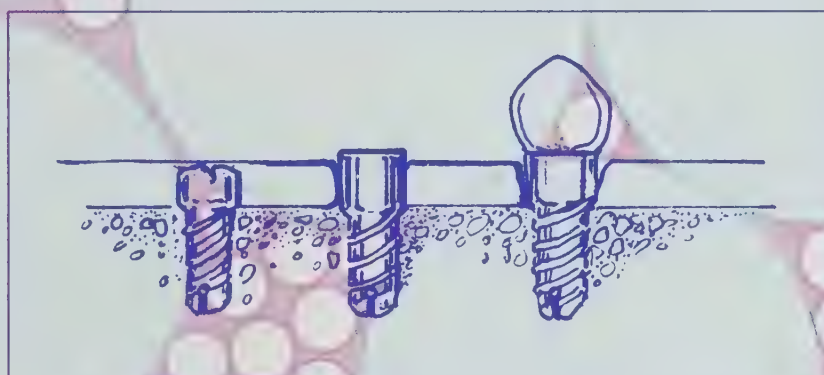
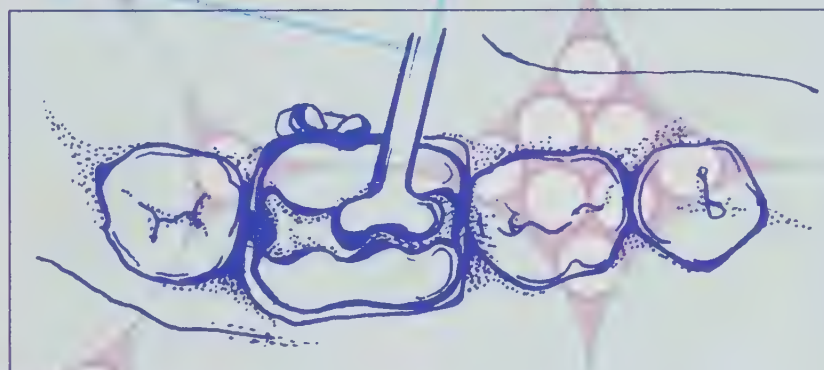
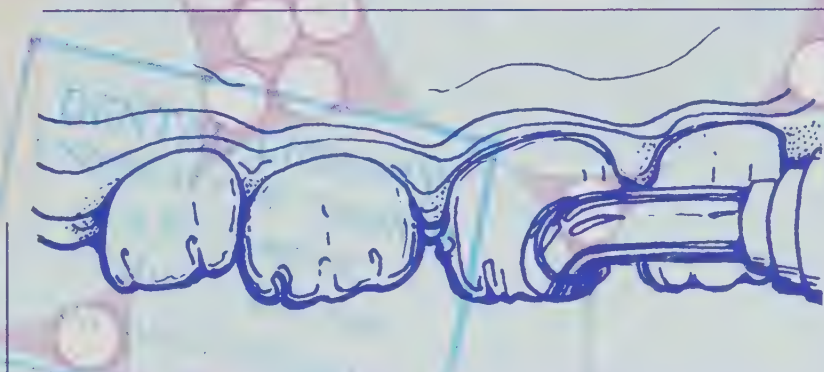
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The Canadian Dental Association serves the dental profession — and through the profession the Canadian public — as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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This month's cover illustrates different dental materials in use today.

Cover design by
Louise Després Jones.

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¹ American Dental Association Council on Dental Therapeutics. Acceptance of (synthetic phenol) disinfectant for instruments and equipment. JADA 110 394, 1985

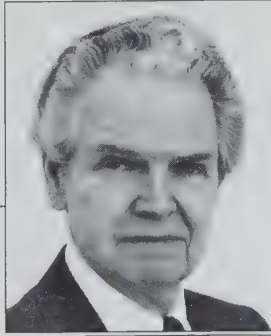


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Eagles and Turkeys

Two incidents occurring at opposite ends of the country had concerned individuals perplexed about standards of dentistry.

Incident one: a prosthodontist with a reputation for excellence had to remove a 12 unit fixed porcelain/metal bridge for a very distraught patient. Distraught because the bridge, costing over \$10,000, had come loose three times since its original cementation just four years earlier. Besides, the patient was now faced with further extensive (rhymes with expensive) treatment, and at best a removable overdenture.

The 12 units of bridgework had been placed upon four poorly prepared abutments and even a casual consideration of the involved torques and strains doomed the prosthesis to failure. The ethics of our profession told the prosthodontist open criticism of someone else's treatment was prohibited, but he was unable to restrain himself from muttering, "How can dentistry ever expect to soar like eagles when we have to put up with turkeys!"

The prosthodontist's metaphor may not have been poetic English but the meaning was very, very clear. The profession must recognize that even one case of poor treatment is too much — and every indication points to far more than isolated misadventure.

Incident two: a dental faculty member referred a friend to a recent graduate who had shown considerable promise during the undergraduate years. Imagine the consternation when the dedicated teacher discovered his pupil of pride had inserted a complex class IV composite restoration without rubber dam.

Not that the absence of rubber dam is a heinous crime. Some fine operators can place fine restorations without it (sometimes!). What was disturbing was that the dentist knew better. In fact he had mentioned to the patient the material was moisture sensitive and cautioned, "Please don't touch with your tongue".

The teacher was disappointed, and disgruntled. He said, "I don't know why we go to all the trouble of teaching superior dentistry when the first week after graduation they look for the easy way out."

There has never been an easy method to deal with human inadequacies. Libraries are filled with overflowing with treatises on morality. Dentists who have been taught excellence make their own choice of mediocrity. The pity is, in almost all cases, an innocent party suffers. In dentistry it is the patient.

Concerned practitioners, licensing authorities and dental faculties cannot afford the luxury of complacency or protection. An informed consumer and a litigious society will simply not tolerate it. At a time when codes of ethics and behavioral bylaws are being reviewed — particularly since the recent Supreme Court decision on advertising — it is incumbent upon dental authorities to initiate and sustain a renaissance in disciplinary determination.

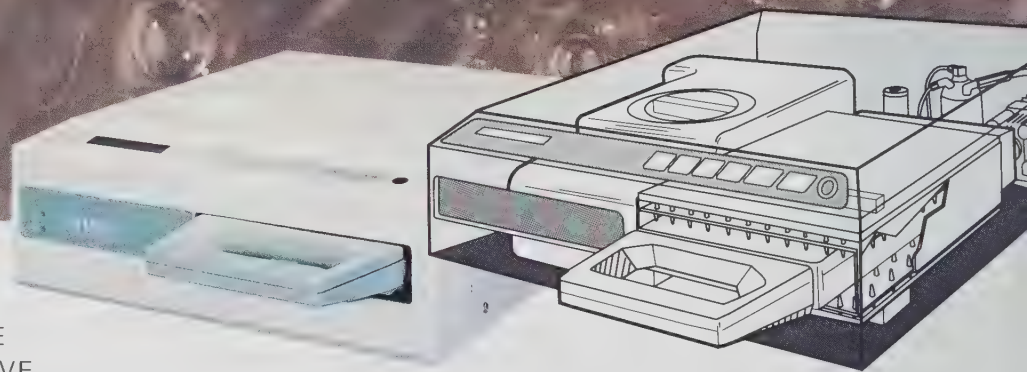
Dentistry has the physical and practical potential to soar as eagles to ever greater heights. It should never be dragged into the mire by a few flightless turkeys.

P. Ralph Crawford, BA, DMD

Editor: Journal of the Canadian Dental Association

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An Interview with Gilles Dubé, CDA President

P. Ralph Crawford, BA, DMD

On August 24, 1990, Dr. Gilles Dubé of Lachute, Québec, was installed as the 71st President of the Canadian Dental Association. At age 38, Dr. Dubé is the youngest dentist to serve in the Association's highest office. It has been a natural transition. Since his days in dental college in the 1970s Dr. Dubé exhibited extraordinary organizational ability.

In 1974, one year after entering the Université de Montréal Faculty of Dentistry, Dr. Dubé was a student representative to the CDA Convention. He was Class President in his senior dental year. Upon receiving his DMD degree in 1977, he practised in Laval, Québec for more than nine years before moving to Lachute, less than an hour's drive from Montréal.

Dr. Dubé was President of La société dentaire des Laurentides in 1980-1981 and represented the region at the Québec Dental Association level in 1980. By 1982 he was on the QDSA's executive. First elected a Governor of the CDA in 1986, he was on the Executive Council the same year. Despite the heavy workload of the CDA Executive Council including chairing the Membership Committee and representing CDA on the CDSPI Board of Directors, Dr. Dubé was able to complete the requirements for a Master's degree in Health Administration from the Faculty of Medicine of the Université de Montréal.

Journal: Dr. Dubé, at age 38 you are the youngest dentist to serve in the Canadian Dental Association's highest office. You have been "involved" since your college days — tell us, what drives you to accomplish so many things?

Dr. Dubé: When you love your profession and enjoy what you are doing, it really doesn't seem to be that much work. It has just seemed natural to me to be active in organized dentistry. One of the great benefits is to have the opportunity to work with many talented people across the country.



Gilles Dubé
President, Canadian Dental Association

Journal: It's great to enjoy what you are doing but how do you possibly find the time — there are only 24 hours in a day?

Dr. Dubé: First and foremost, you must have great support from your family, your staff, your dental partner and from the staff of the Canadian Dental Association. It would be impossible otherwise.

Having said that, you have to be convinced in what you are doing and if you are enthusiastic you somehow find the time and energy to achieve your goals.

Journal: You are the first francophone President since Dr. Louis Bernier's term in 1972 and the first President from Québec since Dr. Clyde Covit in 1979. During this period of time in Canada when so much is heard of unity, what is your viewpoint on the role of the Canadian Dental Association being the national "voice" of the dental profession in Canada?

Dr. Dubé: CDA is a microcosm of the mosaic of Canada, ten provinces from

sea to sea, each with distinct characteristics. My vision is one of unity made up of many facets with a focus to a common goal—optimal dental care for all Canadians.

Certainly, during the last few months I have given serious thought to the role of a Quebecer within a national organization, but I am convinced the CDA is **not** a political association. We can't always set politics aside but the major role of CDA is dental care and from my point of view it's really above any kind of politics.

The first thing you should learn in organized dentistry is the specific mandate of the association to which you belong, its mission. In the CDA it is to serve its members and the public; it is not to win political elections.

Journal: Can we talk about CDA membership. In Québec and Ontario membership in CDA is voluntary (a provincial statute and not by dental association choice). Why do only 50 percent of the dentists from Québec choose to belong to the National Association?

Dr. Dubé: I believe one of the major weaknesses of any professional association is in communication. There are times when CDA has problems communicating with members regarding what we are attempting to achieve but over the past couple of years we have developed an entirely new communications strategy. I am really proud to be part of CDA at this time — we are an association that is going for the top.

Many Québec dentists don't exactly know or understand CDA's mandate and what CDA can do for them. I am not going to try to hide the past problems between CDA and the Québec Association but when you think of it, the CDA, the Québec Association and the Ontario Dental Association really

have complementary roles. My intent in the next year will be to give much more information to the dentists in the voluntary provinces about what CDA has accomplished for them in the past and what we are looking for in the future.

As I said we have to put aside politics when talking dentistry. If we go to the Québec dentists and explain exactly what CDA is attempting to achieve, I don't see any reason why they wouldn't join. They will want to know CDA isn't just a large political machine but a national professional association with the proud goal of optimal dental care for the entire population.

My personal agenda is to try to meet every component society in Québec and explain CDA's mandate. Dentists in Québec are known to be able to make their own judgements on problems. I see a positive trend. If we provide them with appropriate information and show we really care, they will want to be part of the national Association.

Journal: We know that as Chairman of the Management Committee, you have had a direct interest in budget control. You have also gained the reputation of having a "sharp pencil" when it comes to controlling expenditures in relation to revenue.

Tell us, what implication do the membership figures in the voluntary provinces have for CDA programs and projects?

Dr. Dubé: I am pleased with the manner in which we have handled our financial resources over the last couple of years. We have been most efficient with the available funds. Much of the credit must go to CDA staff and the voluntary dentists serving on our Committees and Councils. They have expended many extra hours to achieve fiscal responsibility.

At the moment, more than 60 per cent of CDA's revenue is dependent upon membership dollars so it is important to increase numbers in the voluntary provinces to sustain CDA's viable programs and projects. As an Association we need membership — without members there is no Association — and we must continue to be creative in finding ways to increase non-dues revenue.

Journal: It appears the average age of dentists is increasing. As more dentists retire early there is a possibility of CDA losing its traditional support. What is



Dr. Dubé takes a moment from his busy practice in Lachute Québec, to pose with his staff. Left to right: Joelle Laroque, Josée Durocher, Johanne Guindon.

CDA doing to encourage commitment from the new graduates and younger dentists, particularly in the voluntary provinces?

Dr. Dubé: As a former Chairman of the Membership Committee, I certainly recognize the need to encourage commitment not only from younger members but also from those dentists who retire from active practice. Membership is a CDA priority and we are looking at programs to diminish financial burdens, particularly for new graduates.

Journal: Ontario has had its own mandatory malpractice insurance plan administered by the RCDS for years. Last year it was noted the licensing body in Québec replaced the CDSPI program with one of its own. Could you comment on this?

Dr. Dubé: I think we need to respect Québec's choice. It is within its provincial mandate to choose its own plan. CDA did what it could to help Québec dentists understand the intricate problems of malpractice insurance and I personally have held information nights to give the dentists all the necessary information. The Order of Dentists of Québec analyzed the pros and cons of adding a self-practice insurance pro-

gram and felt that they made the correct decision.

We know the CDSPI program is one of the best in Canada, and I am proud to be part of it, but we have to respect provincial positions. However, when I look at the malpractice situation in the United States, I am more convinced than ever that the more people that belong to a national program, the fewer the risks.

Journal: Dr. Dubé, you were instrumental in having a motion presented to the Board of Governors in March directing Executive Council to "take the necessary measures to re-evaluate a strategic approach in professional resource utilization (manpower)". Can you indicate the severity of the "busyness problem" and what the CDA is doing about it?

Dr. Dubé: Your question is a fair one, but I don't see the busyness problem as being really severe. I believe the level of severity varies from province to province. In British Columbia there is a real concern, and in other regions of Canada the problem is not felt to be as acute. However, I certainly think it is one of the issues and problems that must constantly receive CDA surveillance and participation.

I would like to see a dynamic model established with input from all the "players" in the profession. It would be nice to draft a model that would be acceptable to everyone and one we would be able to use long-term. As dentistry plans for the year 2000 and beyond, we will require a model that can accurately predict the interplay between the human resource issues and the dental trends.

This dynamic model should involve dentists, educators, hygienists, assistants, denturists and technicians. It should include as much data as possible from CDA's Dental Awareness Program and major epidemiological studies.

Journal: You have just made reference to the CDA Dental Awareness Program. Since its introduction in 1984 the corporate contribution has been almost \$5 million. At the same time there appears to be a decrease in the percentage of dollars committed by the profession.

Is there a danger in CDA depending too strongly upon outside money for a responsibility presumed to belong to the profession?

Dr. Dubé: I don't see any danger at all in CDA accepting "outside" money for the Dental Awareness Program. I think it's good management for CDA to encourage the corporate sector to be partners in such an important aspect as dental health. It shows our leadership. Dental Awareness is everyone's responsibility. I am particularly pleased to see many of the provinces following our example.

Journal: We have heard it is costing over \$1,500,000 to renovate the CDA headquarters in Ottawa. The building is not quite 15 years old. We also know that you personally are very cost-conscious and watch the budget closely.

Tell us, is "bigger really better"? What will the renovations accomplish?

Dr. Dubé: CDA in Ottawa has been facing a space problem for several years. We just discussed the Dental Awareness Program; it is just one of many additional projects and programs added to the CDA agenda that did not exist when the building was planned in 1975. The CDA is a much more active organization. Besides Dental Awareness, in the past few years alone we have added a marketing section, Dialogue in Dentistry, a proactive government relations program, an extremely

active Third Party Committee, a much enhanced accreditation process, and the list goes on.

Our dedicated staff have to be given a great deal of credit. They have been working under confined and difficult conditions. The renovations will provide the physical surroundings they deserve when working so hard for the benefit of all dentists in Canada.

I want to take this opportunity to invite dentists and their co-workers to visit CDA's Ottawa "home". We are very proud of our organization and would like you to meet the entire CDA family. They want to meet you!

Journal: Dr. Bob Hicks and CDA's Taxation Committee have been influential in dental services having "tax-exempt" status for the upcoming GST legislation. Yet some members have criticized this action.

Can you explain the Committee's reasoning in seeking "GST tax exempt"?

Dr. Dubé: The entire role of our taxation lobby is an excellent example of the importance of CDA acting on behalf of dentistry at the national level.

The rationale behind the GST position is quite simple. In CDA's early discussions with the Department of Finance, our proposal was that dental services would be "zero-rated" — no tax on dental fees and no tax on dental practice expenses. Finance found this unacceptable for all health services.

If dental services were taxable, our patients would pay seven per cent higher dental fees in 1991, while dentists would pay no GST on expenses. Under tax-exempt status our patients will pay approximately two and a half per cent higher dental fees in 1991 to reimburse the dentist for the GST paid. In both cases, the dentist experiences no increased tax load.

We must be aware that dental services are "price sensitive" to the degree that a seven per cent increase in 1991 (in addition to the usual inflationary increases) could have led to less demand for dental services. We must be sensitive to the need to protect the accessibility to the dental office by the Canadian public.

I particularly want to thank Dr. Hicks

and his committee. Every Canadian dentist has benefitted immensely as a result of their activities.

Journal: A final question: Dr. Dubé, what would you say are your three main priorities during your term of office?

Dr. Dubé: At the outset, I believe it is important for any President to have some kind of personal agenda. As President, I want to act as a leader of a team. I don't want to be remembered as "one" of the Presidents, but only want to see CDA more proactive in a variety of endeavors.

As a priority I would like to be able to clarify and maintain the link between CDA and all the associations involved in organized dentistry. The provincial associations, the licensing bodies, ACFD, NDEB, RCDC, AND CDSPI are all part of the dental mosaic. We are proud of our good relationships with these organizations but our current strategy directs us to instill more openness, more communication. CDA needs to show leadership.

We want to work in such a manner that all our endeavors are complementary.

Another priority would be to re-evaluate all the programs and activities within CDA in such a way that together we will establish an agenda for the future appropriate to our financial resources. Without that kind of understanding, no professional association can work effectively.

A third priority is one in which we haven't been very active — dental research. I feel strongly about CDA's role as a leader in the promotion of dental research. We should act as a national research resource centre. CDA should be the catalyst between academics, government and industry.

Finally, no individual can accomplish a great deal in isolation. I am a strong believer in the teamwork concept. I am very fortunate that the "players" on our CDA team are so dedicated. △

Associate Editor retires



Mr Clarence Metcalfe

Mr Clarence Metcalfe, Associate Editor of the *Journal*, retired in August after years of dedicated service. Coming to the *Journal*, in April of 1982, Clarence was always recognized for his professional demeanour, kindly manner and gentle humour.

A native of the Ottawa Valley he served with the Royal Canadian Air Force from 1942 to 1945 and served overseas with the No. 6 Bomber Command. In 1949 he received a Bachelor of Journalism degree from Carleton University following which he worked for a number of years in his family's retail appliance business.

One of Mr. Metcalfe's first roles in journalism was editor of the weekly newspaper "*The Arnprior Chronicle*", during the mid 1960s. He joined the editorial staff at the *Ottawa Journal* in 1968 and from 1974 to 1980 was editor of the weekly entertainment supplement, "*TV Journal*". Shortly after the *Ottawa Journal* ceased publication he assumed his present role for the CDA *Journal* where he became a familiar scholarly name with dental authors and contributors across Canada.

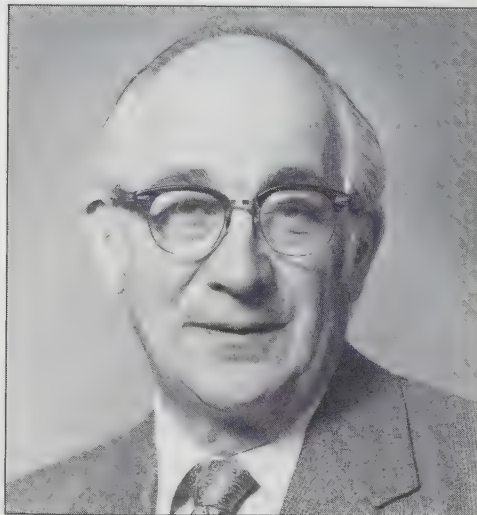
The Canadian Dental Association, and the *Journal* staff in particular, extend to Clarence and his wife Donna, best wishes for many, many years of enjoyable retirement. △

Dean Emeritus Dr. Arthur Schwartz

Dr. Arthur Schwartz, who stepped down as Dean of Dentistry, University of Manitoba, in 1989, received the title of Dean Emeritus of the Faculty at the University's Spring Convocation.

He served as Dean from 1978 to 1989. Among his many accomplishments was a major role in negotiating contracts whereby the dental faculty became the provider of dental services in northern, institutional and community settings. Dr. Schwartz also established a mobile dental service to bring treatment to non-ambulatory, handicapped patients. Committed to the continuing education of the dental profession, he initiated professional development and refresher programs for urban and rural dentists in Manitoba.

The Canadian Dental Association and associated bodies have also benefitted from Dr. Schwartz's distinguished service and leadership. He is a past chairman of the old Council on Education and Accreditation, a past president



Dr. Arthur Schwartz

of the Association of Canadian Faculties of Dentistry, was Chairman of the Ad Hoc Committee on Certification of Dental Specialties, is currently Chairman of the Council on Accreditation and CDA representative on the National Dental Examining Board. A member of the Canadian Dental Foundation, Dr. Schwartz earlier served as a member of the Task Force on CDA/ADA Reciprocity on Accreditation. △

Dr. John Speck retires from Faculty, U of T



Dr. John Speck

Dr. John Speck retired from the Faculty of Dentistry, University of Toronto, in July, after a 38-year career in the Department of Periodontics.

He served as Chairman of the Department of Periodontics from 1971 to 1988. He is the Registrar-Secretary-Treasurer of the Royal College of Dentists of Canada and former Examiner-in-Chief of the College. He is also a past president of the Canadian Academy of Periodontology.

Over the years, Dr. Speck worked hard to promote periodontics, and had taught not only general practitioners, but had also helped train many of Canada's periodontists. An Alumni Day was held recently in Toronto to honor Dr. Speck. It was attended by many of the periodontal alumni of the University of Toronto.

He plans to enjoy his retirement and also continue in his part-time private practice of periodontics. △

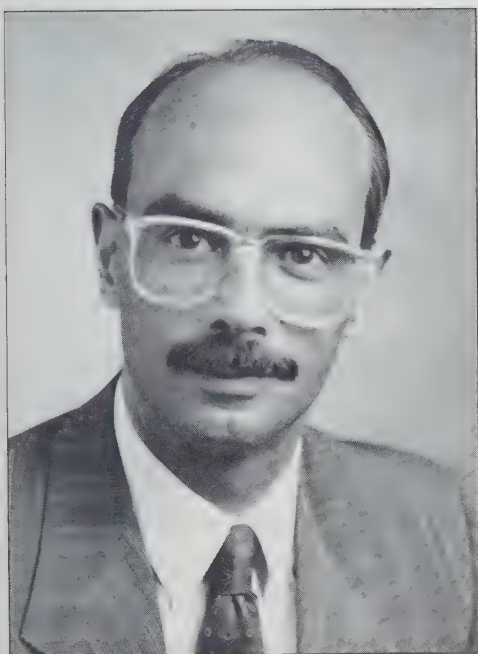
Dr. Brian E. Leroy named ADA Registrar

Dr. Brian E. Leroy, who has been serving as Associate Registrar with the Alberta Dental Association since February, 1988, assumed office on July 1, last, as Registrar.

A graduate of the University of Alberta where he earned a BSc and in 1973, a DDS degree, Dr. Leroy conducted a private practice in Fairview, Alberta until early in 1988. He was an active member of the Peace River District Dental Society and served in most of that Society's executive positions.

He has served on a number of Alberta Dental Association committees from 1982 to 1988, particularly those related to Mediations and Peer Review.

As Associate Registrar of the ADA, he has served in matters related to Mediation, Peer Review and Discipline.



Dr. Brian E. Leroy

His appointment as Registrar is in keeping with the internal reorganization of the ADA which has been in progress for the past year.

Dr. Bruno Martinello, who has been serving as Executive Director/Registrar, continues in the office of Executive Director of the ADA. △

CDA Names President-Elect and Vice-President

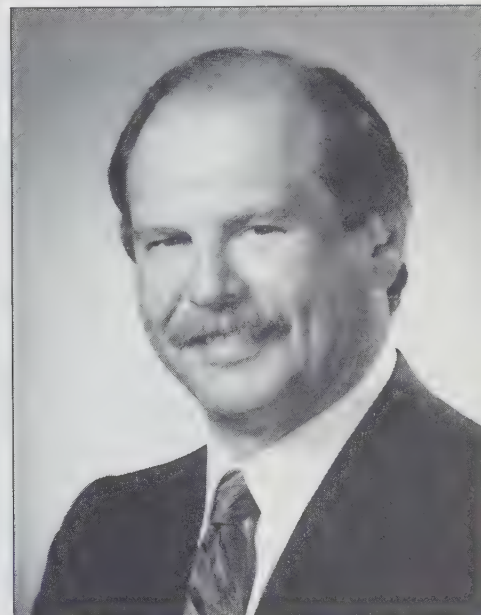


Dr. Bernard Dolansky

The CDA Board of Governors at its Annual Meeting elected **Dr. Bernard Dolansky** Vice-President for the 1990-91 term. **Dr. Les Allen** assumed the office of President-Elect. They join President Gilles Dubé and Past President Kevin Roach as members of the Management Committee.

Dr. Les Allen of Winnipeg, Manitoba has been the Manitoba representative on the Board of Governors since 1985 and a member of Executive Council since 1987. Among his many responsibilities on Executive Council Dr. Allen has been the Chairman of the sub-committee, Third Party CDA Alternate Delivery Systems and Chairman of the Government Relations Committee. He also served as Executive Liaison to the Information Services Committee, Dental Specialties Committee and the Taxation Committee.

Dr. Allen received his dental degree from the University of Manitoba in 1969, as well as a Bachelor of Commerce degree in 1965. Since graduation he has been associated in practice with his father, Dr. Harvey Allen, a 1940 University of Toronto graduate. The Allens are the only "Father and Son" dentists to have both served as Presi-



Dr. Les Allen

dents of the Manitoba Dental Association—Dr. Harvey in 1963-64 and Dr. Les in 1985-86.

Dr. Bernard Dolansky, an Ottawa, Ontario endodontist has been active in organized dentistry throughout most of his practice years. He was President of the Ottawa Dental Society in 1980-81 and President of the Ontario Dental Association in 1986-87. He first served on the CDA Board of Governors in 1983 and was elected to the Executive Council in 1988.

His numerous duties have included Chairman of the Membership Committee and Executive Liaison to the Committees on Dental Materials and Devices; Consumer Product Recognition and the Third Party Dental Plans. For more than a year he has served "above and beyond" as Chairman of the CDA EDI Sub-Committee.

Dr. Dolansky graduated with a BA in 1966 from McGill University and received his dental degree from the Université de Montréal Faculty of Dentistry in 1970. Attending Northwestern University, Chicago, Illinois, he was awarded a Master of Science degree with Certification in Endodontics in 1973. △

Licensing bodies rewrite regulations pertaining to advertising by dentists



Supreme Court Building, Ottawa.

Licensing bodies across Canada are revising restrictions against dental practice advertising following the Supreme Court of Canada ruling which struck down certain restrictions of the Royal College of Dentists of Ontario as "unconstitutional".

In its 7-0 judgement, the Supreme Court ruled that the Ontario College regulation that restricted dentists to listing their names, addresses and telephone numbers on business cards and in telephone directories, violates the Charter of Rights and Freedoms guarantee of freedom of expression.

Madame Justice Beverley McLachlin stated in her judgement that the public has an interest in "obtaining information as to dentists' office hours, the languages spoken and other objective facts relevant to their practice—information which (the regulation) prohibits dentists from conveying by advertising."

"Useful information is restricted without justification", she said.

However, Madame Justice McLachlin believed that professional regulating bodies have "a legitimate interest" in adopting regulations that promote and protect the public from "irresponsible

and misleading" advertising.

She held that the rules of the Ontario College were too broad in their scope, restricting constitutionally protected commercial expression.

Certain restrictions were still necessary in dental advertising, such as those which would prevent dentists or other professionals claiming themselves to be more competent than their colleagues, she stated. "There is no way in which the average consumer can verify such claims."

Affects all professionals

"The ruling affects virtually every professional body across Canada, not just dentists," immediate past Registrar of the Ontario Royal College, Dr. Ken Pownall, told this Journal. "No licensing body can be too strict with its regulations".

In those provinces, where, for example, licensing bodies have in recent years established regulations about the size and nature of exterior signs dentists may display, "those regulations have all been struck down", Dr. Pownall said.

In Ontario, where the legal action

which culminated in the Supreme Court decision originated, the College immediately began consultations and meetings to redraft the regulations. Dr. Pownall believed it may be possible to control advertising through a section which states that dentists can't do "anything unprofessional or unethical".

Originated with magazine advertisement

The legal action was precipitated when Drs. Brian Price and Howard Rocket, the entrepreneurs who co-founded Tridont Health Care Inc., a chain of dental clinics, appeared in an advertisement for the Holiday Inn hostelry firm, in 1986.

Dr. Pownall said the Ontario College received a flood of complaints from dentists, angrily protesting this incident was flagrantly unprofessional and in violation of the Health Disciplines Act. It became a Charter of Rights and Freedoms court challenge.

An Ontario court ruled that a professional licensing body such as the RCDS has the right to set standards of professional conduct. △

The Tridont firm believed it had discretionary rights and appealed the decision. It was subsequently overturned by the Ontario Court of Appeal.

The Royal College then appealed that decision to the Supreme Court of Canada. The case was heard there on March 22, last.

The CDA responds

The Canadian Dental Association's

Committee on Ethics drafted a new "CDA Policy Statement on Advertising" in view of this legal eventuality, and it was subsequently approved by CDA's Executive Council. In August at the annual meeting of the CDA Board of Governors, the statement was endorsed as CDA policy.

(The text of this statement accompanies this article, below).

CDA Policy Statement on Advertising

The Canadian Dental Association is dedicated to the principle that all Canadians should have the best oral health care that it is possible to provide. The Association recognizes that health promotional programs such as institutional advertising are an essential education tool to increase public awareness of the value of oral health. Such programs should be designed to influence the public to make informed choices when dealing with oral health issues.

The CDA believes the most effective promotional programs will result from professionally designed campaigns sponsored at the national and provincial levels. Such an approach will maximize the use of available resources and complement other public health education programs or dental industry activities.

The CDA considers that advertising by individual dentists which directly or indirectly is designed for the aggrandizement of the individual dentist or a dental practice is inappropriate. Such advertising will only serve to increase direct treatment costs to the patient without contributing to the goal of improving oral health of all Canadians.

Therefore, the CDA promotes the concept of institutional advertising as opposed to the concept of individual advertising.

*Committee on Ethics
Canadian Dental Association
August 1990.*

Did you know?

It is the same; Yesterday, Today and Tomorrow...

"Every dentist who can rise above mere local or provincial affairs in our country, and has thought about the immense advantages to be gained by the nationalization of the dental profession, should unhesitatingly give the idea his support. The legal representatives of the profession in the various provinces have agreed to work together toward giving dentistry a national character."

Dr. Eudore Dubeau, secretary of the Quebec Dental Association, at the founding of the Canadian Dental Association in Montreal, 1902.

Obituaries/Nécrologies

Whetham, Frank O.: Dr. Whetham passed away on May 30th, 1990, in his 83rd year. A 1934 graduate of the University of Toronto and a Life Member of the Canadian Dental Association he conducted a private practice in Hamilton for 41 years.

Bona, Andrew D.: A former teacher before service in the Royal Air Force during World War II, Dr. Bona graduated in dentistry from Dalhousie University in 1951. Maintaining a private practice in Saint John, New Brunswick, Dr. Bona was active in his community and dental organizations. He was a past president of the New Brunswick Dental Association, a former school trustee, and for ten years was president of the New Brunswick Competitive Festival of Music.

Duncan, Harvey Daniel: A 1924 graduate from the University of Toronto, Dr. Duncan died in Calgary at the age of 94. A native of Summerside P.E.I., he was a veteran of World War I. He practised in Calgary, Alberta until retirement in 1966.

Nishiguchi, Kaichi Kay: Dr. Nishiguchi passed away on June 5th, 1990, at the age of 63. He graduated from the University of Oregon in June 1954 and practised in Vancouver, B.C. He is survived by his wife, Amy and two daughters, Melanie and Lisa.

Proposed Ontario legislation regulates 24 of the health professions

Ontario's new Health Professions Regulation Act, 1990, was tabled in the Legislative Assembly in June.

Now 24 of the health professions in Ontario will be regulated rather than the previous 19.

Dental hygienists, dieticians, medical laboratory technologists, midwives, occupational therapists, audiologists and speech language pathologists, became self-regulating professions for the first time.

"The introduction of this legislation follows one of the most extensive and detailed consultations ever undertaken in this (Ontario) province," Health Minister Elinor Caplan said. "During the course of our discussions, we have involved the health professional organizations (including dentists), and many consumer and public interest groups."

Several professions will be clustered together in one governing body or college. Audiologists and speech language pathologists will be governed by one college, as will chiropractors and podiatrists, physicians and osteopaths.

The Health Professions Regulation Act includes one omnibus procedural code that pertains to all professions. There are 21 separate acts which describe the specific scope of practice of each profession and the controlled acts which each profession will be legally entitled to perform.

While agreeing with the intent of the legislation, some clergy and social workers, among others, have expressed reservations about the wording of certain clauses such as section 27.04.

This so-called "basket clause" would make it an offence for an unregulated practitioner to provide treatment or advice in circumstances where a patient might be exposed to harm. Section 27.04 was not included in the legislation introduced in June.

"It is not the policy, nor is it the intention of this government to impede social workers, clergy, or others from carrying out their important work," Mrs. Caplan said.

"It is therefore, my intention to introduce wording for a new clause during the committee stage. I will also invite suggestions from interested parties regarding new wording in order to achieve our objective," the minister added.

In addition, services provided by personal care attendants who work with disabled persons will be exempt from the controlled acts so that there is no interference with disabled persons obtaining assistance with the routine activities of daily living.

The Health Professions Regulatory Advisory Council, a new body established by the legislation, will advise the health minister on issues pertaining to the regulation of these health professions. The Council will also participate in a review of the new legislation after it has been in effect for five years.

Regulated under earlier statutes

Prior to this legislation, 19 of the health profession groups in the province were regulated by statute. Of these, five were governed by the 1925 Drugless Practitioners Act, seven by the 1974 Health Disciplines Act and seven by individual statutes dating as far back as 1944.

It was determined that the statutory "patchwork" offered no uniform system of regulatory control and proved difficult to update.

Legislators were advised that there was considerable pressure to change the existing framework of legislation, both from the public, who lacked confidence in the current complaints and

disciplinary processes, and health professionals, who believed the previous system was "unworkable."

'Schwartz Report'

Toronto lawyer Alan Schwartz was commissioned in November 1982 to carry out a review of existing health professions legislation. The Review's mandate was to make recommendations to the Minister of Health on which health professions should be regulated, and to update and reform the Health Disciplines Act and related legislation.

One of the Review's guiding principles was that the public must be permitted to exercise freedom of choice of health care provider within a range of safe options.

The report of the Health Professions Legislation Review was tabled in the legislature on January 26, 1989, in the form of draft legislation. It is entitled, "Striking a New Balance: A Blueprint for the Regulation of Ontario's Health Professions."

Public accountability

Health Ministry statements comment that "as the name suggests, the proposals strive to find a balance between professional independence and public accountability. Accountability would be enhanced by increasing the number of public members on councils and committees, opening council meetings, discipline hearings and complaint reviews to the public, giving the public greater access to college registers and requiring colleges to file annual reports with the Ministry and to publish disciplinary decisions and reasons."

The Ministry's background statement also noted that "public protection would be enhanced by extending colleges' powers to ensure members are competent". △

14th Dental Unit commemorates 75th Anniversary of Canadian Forces Dental Services

On April 20th., exactly 75 years to the day, the 14th Dental Unit (Prairie Region — Air Command) celebrated the formation of a dental corps in the Canadian Armed Forces. Highlighting a number of events was a formal dinner at Winnipeg's historic Hotel Fort Garry. Representatives from all dental detachments in Manitoba, Saskatchewan and Alberta were in attendance, as well as other dignitaries from the dental profession.



Dr. Jack Abra, a distinguished former member of the Dental Corps and a past president of the Canadian Dental Association, traced the history of Canadian military dentistry in his keynote address.



The Lieutenant-Governor of Manitoba, the Hon. Dr. George Johnson (centre) was host at a reception at Government House to formally begin the CFDS Anniversary celebrations. Shown with His Honour, from left to right, are: BGen (ret'd) Garth Evans (former Director General, Dental Services); BGen (ret'd) William R. Thompson (former DGDS and current CFDS Colonel Commandant); Colonel Victor J. Lanctis (Commanding Officer 14 Dental Unit) and BGen (ret'd) James N. Wright (immediate past DGDS).



Manitoba's Lieutenant-Governor, the Hon. Dr. George Johnson, congratulates Dr. Daniel Young of Winnipeg after he was awarded an Honorary Membership in the 14th Dental Unit. Dr. Young graduated from the University of Toronto in 1917 and is the last surviving dental officer to have served during the First World War. When he accepted the honor, Dr. Young remarked "This is one of the proudest moments of my 97 years".

Because Your Patients Have Little Patients of Their Own

First Teeth: the award-winning program from the Canadian Dental Association that helps you help parents care for their children's dental health. Supervised by a team of experts in children's dental care, sponsored by Colgate Junior, First Teeth is the CDA's most popular program ever. And its best-loved.

Parents Love It

The First Teeth booklet addresses parents' questions and concerns clearly and directly — 24 pages packed with practical advice and helpful illustrations. Parents love First Teeth because it's professional advice they can use with their own "little patients" every day.

Children Love It

The First Teeth growth chart for children is stacked high with wonderful drawings and fun facts. Kids love First Teeth because it makes dental health child's play.

You'll Love It

First Teeth lets you drive your prevention messages home. Lots of homes. According to the figures, First Teeth has been provided to hundreds of thousands of Canadian parents. You'll love First Teeth for the same reason almost six thousand dentists and dental hygienists do: it's working.

Order Now

- Patient Package (booklet and growth chart): 25 for \$25.00 (\$50.00 CDA non-members); 50 for \$40.00 (\$60.00 CDA non-members)
- Office Package (communication guide, special office poster, sample booklet and growth chart): \$15.00 (\$30.00 CDA non-members)

To order, simply call one of the toll-free numbers below (please have your VISA or Mastercard ready):

Western Canada, Newfoundland and Labrador:

1-800-267-6354

Eastern Canada:

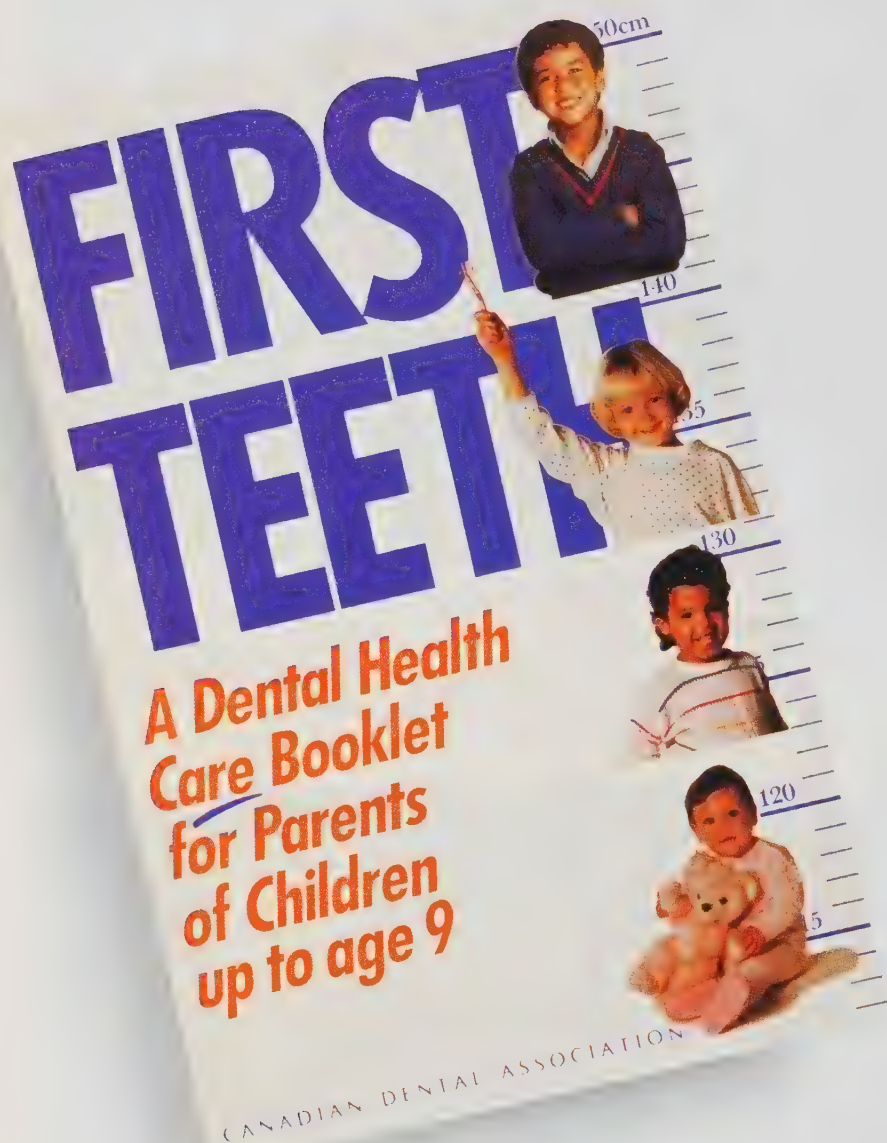
1-800-267-6364

**CANADIAN
DENTAL
ASSOCIATION**

DENTAL HEALTH
Good For Life

Thanks, Colgate Junior: As exclusive sponsor of First Teeth, Colgate Junior is helping to bring CDA's prevention messages to young Canadians. CDA is grateful to Colgate Junior for its ongoing support of the program.

Colgate Junior



From abroad:

A British Commonwealth Dental Association is being organized. The new group would address the future needs and problems facing all member countries in their programs for the delivery of oral health care.

At a workshop for Commonwealth Dental Associations held recently in London, British Dental Association Secretary Norman Whitehouse said "such an association would provide a mechanism to collect information and to communicate, to promote education, and to influence politicians and through that influence to provide funding." He added that he believed the Commonwealth Dental Association could work closely with the Fédération Dentaire Internationale, "feed off its technical expertise, and its existence will enhance (the FDI) without threatening it."

DENTAL AWARENESS PROMOTED IN PRINCE EDWARD ISLAND



Ash Temple Limited was actively promoting dental health awareness in Prince Edward Island in the spring. Shown with the "mobile message" are Mr. Jim Hennessey, Ash Temple representative; Dr. David Richardson, P.E.I. Dental Health Month Chairman, and Dr. Stewart MacDonald, President of the P.E.I. Dental Association.

15
13
11
9

THAT'S HOW MANY CANADIANS ARE WHEEL-CHAIR BASKET-BALL PLAYERS

Way to go, Canada!

PARTICIPATION

CDA Retirement Savings Plan

Unit values: (Funds are valued weekly)

Fund	Unit values as at	
	July 31, 1990	June 30, 1990
Bond & Mortgage Fund	73.35453	72.38529
Common Stock Fund	15.99924	16.08219
Money Market Fund	51.07771	50.59004
Balanced Fund	29.80247	29.73202

G.I.C. Fund		*Interest rates as at	
Term	July 31, 1990	June 30, 1990	
1 yr	13.00%	12.85%	
2 yr	12.55%	12.55%	
3 yr	12.35%	12.30%	
4 yr	12.05%	12.10%	
5 yr	12.05%	12.10%	

(*rates subject to change without notice.)

Total Assets (Market value) of the Plan as of:

July 31, 1990	June 30, 1990
\$124,134,047.70	\$123,436,029.98

For further information:

Write:
CDSPI
Retirement Services Dept.
Suite 600
2 Lansing Square
Willowdale, Ontario
M2J 4Z3

or phone, toll-free:

Western and Atlantic Canada and Ontario Area Code 807 only 1-800-268-5418

Quebec and Ontario, (except Area Code 807) 1-800-268-3411

Metro Toronto Area 497-7117

September 1990 Vol. 56 No. 9

JOURNAL

827

Flexible Clearance Tabs A Reliable Check on Occlusal Reduction for Crowns

H.J. Maier, RDT

In many instances, the amount of occlusal reduction can determine the success or failure of a porcelain-fused-to-metal crown. The dental porcelains available today demonstrate excellent chemical and abrasion resistance, optical properties and good tissue tolerance. However, they are also inherently brittle and exhibit virtually no yield. As a result, they also possess relatively poor impact, tensile and shear strengths. This is the reason that a metal supporting substructure is employed — as a means to partially offset these limitations.

It should be remembered that no part of a restoration puts porcelain under greater stress than the occlusal contact area. In addition, porcelain requires sufficient thickness to achieve its optimal esthetic appearance. All of these factors are the rationale behind the minimum 1.5 to 2.0 mm tooth reduction requested to ensure a strong and beautiful porcelain occlusal surface.

The difficulty that many practitioners face occurs in obtaining an exact reading of the amount of occlusal reduction achieved. With Flexible Clearance Tabs*, the guesswork is eliminated. Now, direct intraoral measurements of occlusal and interproximal tooth reduction can be made quickly, easily and accurately.

Each color-coded, disposable Flexible Clearance Tab is a specific thickness (Pink-1.0 mm, Green-1.5 mm, Blue-2.0 mm) and is used like a gauge to check preparation clearance dimensions. Simply insert a soft rubber Tab between the tooth preparation and its opposing occlusal surface or adjacent tooth and then withdraw it. If the Tab resists



being drawn through the prepared space, there is less space than the thickness of the Tab used. If the Tab draws through freely, this indicates that there is at least as much clearance as the Tab thickness selected. That's all there is to it — quick verification of whether or not adequate preparation clearance has been achieved.

With adequate clearance, your laboratory can construct a crown that will seat easily and avoid the necessity of aggravating adjustments. Certainly, technicians can work with more conservative preparations. However, bear in mind that a conservative preparation usually entails a great deal of internal modification and can result in an anatomy and translucency that leaves much to be desired.

For optimal results, ask your laboratory about Flexible Clearance Tabs.

Mr. H.J. (Hyo) Maier, RDT is President of Aurum Ceramic/Classic Dental Laboratories Ltd.

*product of Belle de St.Claire, Van Nuys, CA.



(Photo: Courtesy of Dr. John Nasedkin, Vancouver.)

DON'T WAIT UNTIL IT HURTS



If it takes pain to get you to go to the dentist, you're asking for trouble. Dental problems usually exist long before there's any noticeable discomfort. See your dentist for preventive checkups.

DENTAL HEALTH
Good For Life

CANADIAN DENTAL ASSOCIATION

CDSPI Reports



Divorce, The Dentist and the RSP

Peter Dennett, Retirement Services, CDSPI

The old adage states that "all marriages are made in Heaven", but unfortunately some fail to pass the Celestial Quality Control standards and don't go the distance.

We sincerely hope that the possibility of divorce is not a part of your future. However, if such an event does occur, unless there is a pre-nuptial or marriage contract, the total net worth is divided evenly between both spouses.

As you can imagine it is not always practical to divide everything in half, such as a house, the dental practice, stocks, bonds, tables, chairs and even a RSP. In one extreme case we heard of a couple taking a saw and literally splitting the house in half. This is most irregular and not very practical. Yes, they divided the asset, but at the same time they more than depleted its value.

On occasions we are asked what happens to a *registered* Retirement Savings Plan (RRSP) when divorce occurs. Over the past decade, changes have been made to make the division of RSPs as easy as possible in the event of a marriage breakdown.

Usually, an amicable divorce results in a division of total assets as previously agreed to by both parties. The major part of certain assets can go to one partner or the other or they can be divided as mutually agreed upon.

For example, the net worth of Dr. and Mrs. John Smith is \$2,100,000. The former Mrs. Smith elects to take the family home valued at \$500,000 while Dr. Smith retains his practice

which is valued at \$600,000 and the cottage in Northern Ontario worth \$400,000. To help balance the assets, Mrs. Smith then obtains \$300,000 worth of securities, made up of stocks and bonds. In addition, there is a \$300,000 RSP in Dr. Smith's name. So that each individual ends up with \$1,050,000, Dr. Smith retains \$50,000 of the RSP while \$250,000 of the Plan is transferred to the former Mrs. Smith as part of the settlement.

The assets could be split any way, as long as everyone winds up with equal shares.

In this case the ex-spouse receives most of the RSP as a settlement. If at any time the former Mrs. Smith withdraws funds from the Plan, the amount withdrawn would be subject to the payment of income tax in the year the withdrawal was made. In such a situation it might be better to transfer assets other than the RSP to avoid the subject of future income tax liability forming part of the settlement.

In the case of a RSP, it can be transferred in whole or in part without penalty, and will not be subject to income tax, but not without a copy of the divorce decree or legal separation papers. These should clearly set out the division of assets and the amount of the RSP that should go to each party.

Revenue Canada Taxation will provide you with a copy of Form T2220 titled "Transfer Between Registered Retirement Savings Plans on Marriage Breakdown", which must be completed and

agreed to by both parties in the divorce action.

If the Plan in question is the Canadian Dental Association Retirement Savings Plan, the ex-spouse of the dentist can continue to maintain the RSP with CDSPI, but cannot make any more contributions to the Plan.

This short article provides only a brief outline of the action that could be taken by the dentist. It is best to have your family lawyer work out all the details of the settlement regarding your RSP holdings and have them sent to the issuer or carrier of the Plan(s) for follow-through on your wishes.

Of course, should you require further information or direction, please contact the Retirement Services Department at CDSPI — *your* service organization. △

CDSPI

Retirement Services Dept.
Suite 600
2 Lansing Square
Willowdale, Ontario
M2J 4Z3

or phone, toll-free:

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The DAP Advisor offers information, ideas and advice to improve dentist/patient communication, raise awareness about good dental health, and help your practice become busier.

We got the T.E.A.M.: Building a Loyal Dental Team

The Welcome Wagon

Inspiring loyalty in a dental team member can begin almost the moment after that person is hired. To make the new member feel as welcome as possible — and feel like part of your team before even starting to work — you might want to follow these steps:

1. Put an announcement about the new member of your dental team in your local paper.
2. A few weeks before the new member starts, introduce the person to the rest of the dental team.
3. Have the receptionist tell patients she's recalling by phone about the new addition to your team, so patients know about it before they come for their visit.
4. Ask other team members to put out the word to patients they see in the office to expect to meet the new member upon their next visit.
5. Post the new member's picture and a brief biographical sketch on your bulletin board or somewhere else in your reception area so patients can "get acquainted" with the person.

When it comes to visiting a dental office, patients are creatures of habit: They like to see the same dental team members from visit to visit. Not only is it comforting for them to see the same faces, it also conveys the impression that yours is a well-run, stable practice that inspires staff loyalty. And from your patients' standpoint, a practice worthy of staff loyalty is also deserving of theirs.

It's not hard to build a practice in which staff members want to stick around for a while. All you have to do is consider their feelings, make them feel part of a larger team effort, and work together toward the same goal; that is, to provide your patients with the best possible care.

Here are some ways to help you build team loyalty:

- **Have regular staff meetings.** They will not only give you a chance to discuss office business, but also allow everyone an opportunity to touch base with each other and feel part of a team. Regular meetings can also help you and your team anticipate problems and head them off, either before they arise, or before they have a chance to become full-blown.
 - **Meet with team members individually.** That will give you a chance to get to know each team member, and find out if the member has any concerns that would have been uncomfortable or inappropriate to raise in the group meeting. For example, one team member may have a conflict with or complaint about another member, and not want to talk about it in front of the group.
- During the meeting you can talk about the member's job performance and offer praise, if it's due, or discuss areas for improvement. The team member, in turn, can give you feedback on your practice, and bring up any concerns they may have.
- **Get together outside the office.** Have dinner sometime, or get together for a staff barbecue or picnic. When you get together like this, it gives your team a chance to get to know each other, and can build camaraderie that they will take back to the office.
 - **Remember special days.** Give team members a card, or even a cake to celebrate birthdays or anniversaries of joining your dental team. It's a nice way to tell team members that you value their work and makes them feel good about being part of your practice.
 - **Encourage team members to keep learning.** Education doesn't necessarily stop just because a person has a certificate, diploma or degree. Support team members who want to upgrade their skills or learn more about their job by encouraging them to take courses and helping pay for them. Taking courses can benefit your entire staff, your practice, and your patients. When a member completes a course, display the certificate so that everyone knows how much you appreciate the person's efforts.
 - **When a team member quits unexpectedly, find out why.** There's not much you can do if a staff member has quit because he or she is leaving town, or feels it's time to move on. But if the person is leaving because of dissatisfaction with you or your practice, then you should know about it. That way, you can address any shortcomings, should they exist, and take steps to ensure that other team members don't — and future employees won't — harbour the same unhappiness.



The DAP Advisor is a service of CDA's Dental Awareness Program, an ongoing campaign dedicated to helping all Canadians keep their teeth Good For Life.

Sleep Apnea

Les apnées du sommeil

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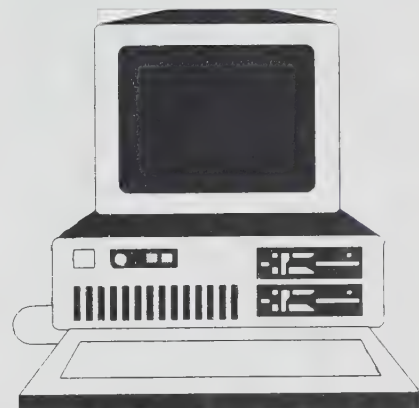
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DIAGNOSIS AND TREATMENT PLANNING IN DENTOFACIAL ORTHOPEDICS

Frans P.G.M. Van der Linden and Herman Boersma

Published by Quintessence Publishing Co. Inc. London, UK., 1987 336 pages

This book is one of a series written by the first author (Van der Linden) in which he has previously discussed development of the dentition, and facial growth and facial orthopedics. As the authors state in their preface, this work is written primarily for dental students and practicing dentists, to inform them of diagnostic criteria and clinical procedures to identify and treat unfavourable dental development and facial growth. An additional objective is to provide the dentist with the relevant information to treat simple orthodontic problems as well as the ability to recognize more complex situations which require referral to a specialist.

The early chapters discuss etiology, anomalies, examination of the patient and diagnostic aids. The middle chapters deal with examination of gathered material, diagnosis and classification, indications and contraindications for treatment and starting points in treatment planning. Later chapters address treatment planning for specific orthodontic problems – Functional anomalies (mouth breathing, thumb and finger habits), Class I anomalies, Class II division 1 anomalies, Class II division 2 anomalies, Class III anomalies, and open bite discrepancies.

The authors use a consistent and logical sequence in each of the chapters dealing with treatment, discussing anatomic aspects, when and how to treat, vertical and transverse abnormalities, crowding and spacing concerns, profile considerations, and retention and relapse.

While the text and terminology used is sometimes a bit wordy the authors do an admirable job covering the complexities of gathering a data base, deciding upon a suitable course of treatment, and of avoiding potential problems. However, several negative factors related mainly to the publishing, detract from the enjoyment of this book. The most nagging problem is that of providing incorrect page num-

bers of figures when referring to previous chapters, as well as typographical errors and incorrect numbers related to the reference section at the end. The book could benefit from a greater number of clinical photographs to help illustrate some of the concepts presented, and some of the figures could be simplified.

Overall, this work is a very useful addition in presenting orthodontic diagnosis and treatment planning for general practitioners. Because the authors discuss many of the more specialized aspects of diagnosis and treatment, orthodontists will also find this a beneficial and interesting book.

*This book was reviewed by:
Jack Turkewicz, DDS, MSc
Associate Professor
Orthodontic Section
Université de Montréal
Faculté de médecine dentaire*

POCKET ATLAS OF HEAD AND NECK MRI ANATOMY

Robert B. Lufkin and William N. Hanafee

*Raven Press, New York, 1989
U.S. \$13.95*

This book lives up to its title in two ways. Firstly it is strictly an atlas – the only prose being confined to the Preface – and secondly it is small enough to slip into a quite small pocket. I fear, indeed, some copies may end up in the laundry.

Seventy pages are illustrated with labelled MR images of the head and neck. The planes of cut are in sagittal, coronal or transverse directions as appropriate and in each case an orthogonal cut identifies the plane. The images are of spin echo sequences with mildly T₁ weighting. These sequences have been chosen to maximize fat/muscle contrast and have succeeded in demonstrating anatomical features extremely well. The anatomical structures are within the grasp of clinically orientated individuals. Unnecessary complication has been avoided.

This will be a useful book for those involved in interpreting MR images of the head and neck and may additionally help those studying anatomy. The lack of complexity, in itself a very attractive feature, is at the same time limiting in

specialized areas. For instance, those hoping to extend their knowledge of MR appearances of the temporomandibular joint will be disappointed. The joint is illustrated, but the disc is not mentioned.

The book ends with a list of 10 references of papers, all of which have included one or both authors in their production. Both authors are well respected, and they have produced an atlas of high quality images.

*This book was reviewed by:
Colin Price, BDS, FDS, RCS, MDS, FRCD(c)
Chairman, Oral Radiology,
Faculty of Dentistry,
University of British Columbia.*

STRATEGY FOR DENTAL CARIES PREVENTION IN EUROPEAN COUNTRIES ACCORDING TO THEIR LAWS AND REGULATIONS

Eds. R.M. Frank and S. O'Hickey

*IRL Press Limited,
Oxford-Washington, DC
1987, 262 pages, \$54.00 U.S.*

This book is a collection of the papers presented at a Symposium on the topic of the book's title held in Paris in June, 1986. It reviews the current and past dental caries situation in 13 western European countries from two perspectives: the dental preventive programs and the legislation governing dental prevention in each country. In addition, the first two chapters by Guggenheim and Ainamo, respectively, summarize the scientific basis of caries prevention and the caries decline in European countries. Guggenheim excellently reviews the rationale governing the various aspects of the preventive approach to dental caries; like others, he is pessimistic about the development and adoption of a successful caries vaccine in the near future. Of interest to readers in North America is the identification and package labelling of snack foods sold in Switzerland that meet certain criteria as "kind" or "safe" for the teeth. Ainamo, like some of the other authors in relation to their respective countries, carefully describes and clarifies the epidemiologic features of

the caries decline (mainly in children) in Europe. Interestingly, he points out that there are great variations in this decline. These range from 80 per cent in certain 12 year-olds exposed to comprehensive preventive programs in Switzerland to no real change in some age groups in the Federal Republic of Germany and France to actual increases in child dental caries in Greece. (Later it is learned that these latter three countries historically have not given strong emphasis to prevention, although current initiatives are underway).

Dental preventive programs and legislation differ widely among the European countries. Indeed, this was one of the purposes of the book so that European governmental policy makers could be made aware of these differences and, in some instances, the large deficits in oral health status that may be associated with deficient programs. However, other than the almost universal suggestion that the increased use of fluoride toothpaste is associated with the caries decline over the past 10-15 years, no single factor emerges as explanatory. Among the 13 countries, water fluoridation is utilized to any degree only in two — Ireland and the United Kingdom. It is not allowed by law in France, the Netherlands, Belgium, Sweden, Denmark and Norway. While water fluoridation is legal in the Federal Republic of Germany, fluoridated milk and salt — popular in some of the other countries — is not. However, presumably because of other individual preventive efforts and programs, reductions in caries have occurred in some of these countries without recourse to water fluoridation.

Most of the authors are internationally prominent. Most chapters are well written, clear and short. For those interested in dental prevention and policy, specifically, and in dental epidemiology, generally, this is a fascinating collection of informative papers. This is particularly true for North Americans who may not be familiar with the European situation and, particularly, the great variation in preventive programs and legislation, oral health status and, apparently, the impact of political philosophy among the various countries there.

*This book was reviewed by:
Don Lewis, DDS, DDPH, MScD, FRCD(C)*

*Department of Community Dentistry
Faculty of Dentistry
University of Toronto*

DENTAL PHOTOGRAPHY

Philip Wander and
Peter Gordon

*Published by the British Dental
Association 96 Pages*

This work on Dental photography was published in association with the British Dental Association's eighth dental teach in. The book is comprised of eight chapters with 142 colour and 117 black and white photographs. The quality of printing is high and the photographs are reproduced very well on excellent quality stock in this spiral bound volume. The general sophistication in technique and equipment we take for granted in North America seems foreign to the authors. Although much of the book is well written and has many excellent points of discussion, much of it is lacking in up to date techniques and equipment and is often contradictory.

The ill-informed Margaret Seward begins the foreword by explaining that this work is the first book in the English language to be published on this subject, to which I and many others take exception.

The book is divided into eight chapters beginning with the use of photography in general practice. The authors present a number of very good ideas for the implementation of photography in the dental practice. This is followed by a very thorough discussion of close-up photography and general photographic principles as they apply to macro work. The chapter is well written however often is too technical for the requirements of the average dental practitioner.

The third chapter deals with equipment. Unfortunately after discussing the standard features to look for, and what is best used, the author suggested the use of a piece of equipment that is outdated, and is contradictory to what was suggested in the first place. The lighting systems described are outdated and do not have enough power for use in the dental field. The discussion does not always allude to the inherent problems of each system. The common

problems experienced with macro lighting and the theory of lighting presented are well written, thorough and excellent in content. The discussion on accessories is very good and the author presents some interesting uses for common mirror tiles for the photography of dental models.

Chapter four deals with the techniques for dental photography. This is a general discussion of how to hold the camera, position the patient, and how to hold the mirrors and retractors. There is an excellent discussion on calibration and magnification ratio determinations for lenses where the ratio is not already marked. General guidelines are given for focusing and composition for anterior and lateral views. The photographs in this section are very good and informative.

The fifth chapter is a description of equipment available in the U.K. This is quite limited in comparison to the equipment we have available in North America. There is however a very good discussion of instant photographic systems available.

The next chapter is a discussion of the applications of photography in the practice with a brief discussion of copying radiographs. However much of the discussion is related to the British MGDS exam requirements and is not very useful to the average North American practitioner.

Chapter seven deals with how to present your photographs, mounting and title slides. This is an excellent discussion of presentation and mounting, however the title slide section is very brief and gives only a limited idea of the possibilities. For the person interested in this aspect of photography, many well written books are available for these subjects. I commend the authors for including this discussion in the text as it may prove to be a quite useful quick info area for many readers.

The next chapter discusses video techniques and equipment. This section deals more with equipment availability than its actual use in the dental office. Again, in North America, we have the luxury of an abundant supply of equipment information. Perhaps a text dealing with the use of video in the dental office would be helpful.

The final section of the book shows numerous before-and-after photographs,

suggested for use in patient management. These photographs can be shown to patients chairside to explain various procedures in dentistry. Some of the photos are excellent while others may not be suitable due to differences in technique. Some is possibly undesirable material to be shown, especially to the queazy patient.

This book conveys many good ideas and informative material. However it is lacking in discussion of North American techniques and equipment and some of the recommendations do not seem to follow the ideals put forward in the discussions of equipment. For the North American practitioner interested in beginning photographic applications in his office this book will act as a good supplement to a better informed work to give some different ideas and uses for photography in the dental office. It is an enjoyable book to read.

*This book was reviewed by:
R.M. Goodlin, DDS,
Aurora, Ont.*

SECOND EDITION: EVALUATION, DIAGNOSIS AND TREATMENT OF OCCLUSAL PROBLEMS: Second edition

Peter E. Dawson.

C.V. Mosby, St. Louis, 1989

This is really an integrated textbook of occlusion, temporomandibular joint and restorative dentistry. The 600 pages have been extensively revised and up-dated in the second edition. It is a book for clinical dental practitioners and it reflects the author's clinical occlusal orientation. This is not a book with information on medication, TNS, postural correction, and cranial manipulation, but a book for wet-gloved dentists.

Especially vivid and useful are the series of coloured illustrations demonstrating both normal disk mechanics and all stages of disk derangement. The book is filled with illustrations of which the black and white line drawings are generally good. But some of the black and white photographs have not transferred well from colour slides.

The real strength of the book is in the combined restorative and occlusal therapy area. Anterior guidance is used as

the introduction to the restoration of the lower anterior teeth where extensive use is made of the esthetic and restorative checklist. This is followed by the restoration of the upper anterior teeth, where the use of the "every-other" preparation approach allows for the duplication of pre-determined values. The plane of occlusion and the restoration of posterior teeth is also discussed in detail. I found Dawson's explanation of the use of the functionally generated path technique to be clearer than I have ever seen it before. He stresses the use of CORRECTLY mounted diagnostic casts and the correct use of instrumentation.

In regard to occlusal splint therapy, I like his concept of the differentiation of permissive and directive splints. Dawson is realistic in describing what splints can and cannot do and he stresses the need for comprehensive testing to rule out the need for a directive splint.

In describing how disks become displaced he concentrates on the physical mechanical aspects of causation. I would have liked to see his interpretation of the work of Atkinson and Bates¹ included in this section, as well as some acknowledgement of upper arch restriction from airway insufficiency and premolar extraction. In discussing the correction of disk displacements he uses a purely mechanical approach and might have included the use of intravenous or nitrous oxide sedation techniques as being helpful. There is excellent material on the use of cephalometrics in general practice.

In the writing, the use of 'canine' instead of 'cuspid,' and 'premolar' instead of 'bicuspid' as recommended by the Glossary of Prosthodontic terms would have been preferred. Direct rather than general references would be more helpful to those following the literature such as at the end of chapter 25 on Bruxism. Many of the references cited could be more current and more readily accessible to his curious readers.

I would have liked a chapter on the role of the occlusion therapist in regard to conjoint TMJ and orthodontic treatments. Post-orthodontic rehabilitative management would also be useful in this area. I'd also like some discussion of the occlusal management of periodontal problems such as chronic margin-

nal periodontal disease in relation to restorative and occlusal treatment.

What I have indicated above are not shortcomings, but areas which might be discussed in a future edition, since there are really so few writers capable of addressing these problems. Dawson has given us a book that tells you how to do it from the viewpoint of the master clinician, with problem-solving answers to the most pressing questions of the day. I view this book as an essential for the dentist who is serious about occlusal and restorative dentistry.

1) Atkinson W.B. and Bates R.E.:
The effects of the angle of the eminence on anterior disk displacement. 1983 *J. Prosthet Dent* 49: 554-555

*Reviewed by John N. Nasedkin, DDS,
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408-1128 Hornby St.
Vancouver, B.C., V6Z 2L4*

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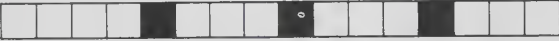
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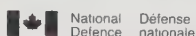
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'Scholarly case report'

Re: Pied Piper Syndrome — J.H. Gryfe, May 1990, Vol. 56 No. 5

I applaud Dr. Gryfe for his scholarly case report of "joint mice" in your May edition.

He is to be commended for drawing our attention to this rare syndrome. The fact that it has only been reported once (by him) should not blind us to the fact that as a general practitioner we must be prepared for anything.

However, I feel he has not reviewed the literature completely. For instance in Britain, this syndrome is routinely treated non-invasively. Findings¹ there suggest that 10 minutes in a CAT scanner will drive the mice to a joint more easily accessible by an orthopedic-type person, who can invade at his or her leisure.

Interestingly, in Australia, it has been reported² that the soft bodies found in the joint have abdominal pouches — naturally there the treatment is by "marsupialization".

Finally, on a point of surgical technique; although the pre-auricular "hockey stick" approach is correct, we here in Brantford prefer the GRETSKY incision — Fast, Clean and most valuable.³

Yours sincerely, with genioglossus firmly in buccal pouch.

Robin Harrison, DDS,
Brantford, Ontario

References

1. Dept. of Health. Pest Control Office.
2. Bruce and Sheila. Personal communication.
3. Don Cherry. Hockey Night in Canada, 1989.

A CFDE Thank You

On behalf of the Canadian Fund for Dental Education, I would like to express our sincere appreciation to Dr. Ralph Crawford and the CDA Journal Staff for their continued support of the Fund in publishing CFDE articles and advertisements throughout the year.

We have come a long way since the CFDE's inception twenty-eight years ago in helping to improve dental health for all Canadians, and we have been fortunate to have had the backing of the CDA Journal every step of the way.

We, at the Fund, know that without your valuable support, we could not succeed in informing the dental profession and dental industry on the important work of the CFDE.

It is a pleasure to be associated with your excellent publication. Our hats are off to you!

Ted E. Ramage
Chairman

Canadian Fund for Dental Education

Home Dental Care Programs

I read with interest "Dentistry for the Homebound and Institutionalized" in the July 1990 issue of the Journal. Since my retirement from private practice several years ago I have conducted a Home Dental Care Program in Nipawin and surrounding communities in northeastern Saskatchewan. Your readers may be interested in comparing a solo program in a rural setting versus the sophistication of a Dental Faculty based service within a large city.

One of the challenges of any mobile program is the selection of equipment. Fortunately I had the experience of "safari" dentistry in Malawi for several years. I also had occasion to observe the University of Manitoba service in action. One of the lessons learned quickly is "keep it simple". Perhaps the most valuable item in my armamentarium is the rechargeable handpiece. I can carry it in my pocket and do prophys, denture adjustments and simple restorative without the encumbrance of hoses and compressors.

Another challenge was the organization of supplies and hand instruments to determine the most efficient transportation. Aluminium camera accessory cases are ideal, supplemented by a multi-pocketed nylon travel bag. An adjustable head rest device which attaches to the handles of a wheel chair solves the problem of transferring patients.

An unexpected challenge was designing simple but adequate charts and forms. My objective is to minimize paper materials. Although I have redesigned charts twice I am sure I will be doing it again as field testing continues.



Dr. Phillips seen packing his compact and simple dental armamentarium prior to embarking on his rounds to provide home dental care.

I am still convinced there is a growing demand for this type of dental service but realize it is not for every practitioner. The unstructured and inconvenient working facilities, and especially the unproductive time spent visiting with patients and family do not always transfer into hard dollars. However, despite frustrations, this program provides me with a wealth of appreciation from my patients plus a real sense of personal accomplishment.

I would be pleased to enter into correspondence with any dentist who wishes to share experiences.

D.E. (Doug) Phillips, DDS, DDPH
Box 2830,
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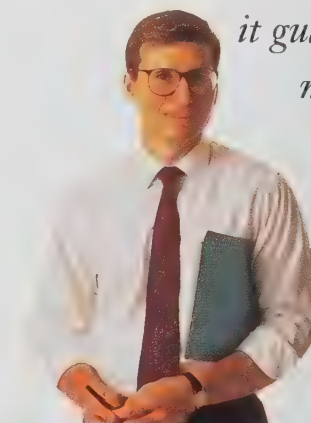
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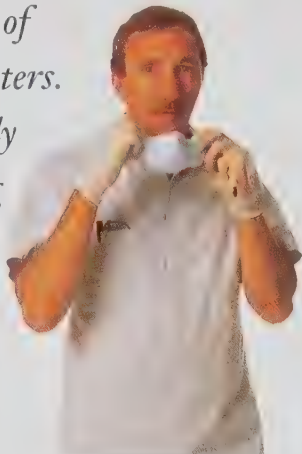
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—John W. McLean, Program Chairman

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Cementing The Future

P. Ralph Crawford, BA, DMD

INTRODUCTION

In November 1989, Dr. Dennis Smith, Director of the University of Toronto's Centre for Biomaterials and Professor of Biomaterials, Faculty of Dentistry, underwent surgery for the first of a pair of hip implants. Ironically, the cement used for fixation of his prosthesis was Dr. Smith's own brainchild, developed some twenty-five years ago. The irony was not lost on Dr. Smith, who describes below how he benefitted from his own skill in invention.

The Journal Editor visited Dr. Smith, one of the world's foremost authorities on dental cement, while he was convalescing at his home in Toronto. He had been out of the hospital only a few days when the interview took place.

PART ONE

Dr. Smith's Surgery (Hip, Hip, Hooray!)

Journal: Dr. Smith, you had prostheses placed in both your hips utilizing a bone cement that you yourself developed. Can you tell us how you came to be a candidate for the implant?

Dr. Smith: I had osteoarthritis for more than ten years and it just got worse as time went on. I took fairly heavy doses of medication as the disease advanced. My condition had deteriorated quite rapidly in the last few years and had become quite painful. I had to make a choice. I was either going to be in a wheelchair or have the joints replaced.

I had to make a choice. I was either going to be in a wheelchair or have the joints replaced.

Journal: What about the operation? We know it is major surgery. Was there much pain and discomfort during the recovery period?

Dr. Smith: I really have to give a great deal of credit to my surgeon, Dr. Allan Gross of Mount Sinai Hospital in Toronto, and his senior resident, Dr. Erin Boynton. The entire operation went very smoothly. After about two hours in the recovery room, I was back in my room. Although I was a bit "woozy" the first night, by the next day I felt fine and took a few steps.

The pain wasn't any worse than having a tooth extracted. I underwent the first operation at about 10:00 a.m. and by 12:30 noon I was out of the operating theatre. It's amazing to think that, in the fifties, these operations used to take six or seven hours. The pain control techniques used today are excellent. During recovery they had me on morphine for the first day or so. Then I was prescribed Tylenol 3. I was never in any serious pain. The hip itself is not painful or sore; any discomfort emanates mostly from the recovery of the wound.

Journal: You said you took a few steps the day after the operation. How soon was it before you could walk unassisted?

Dr. Smith: If a patient has a fully cemented hip joint, the prosthesis is rigid within a half hour after the operation and normally the patient can be walking in three weeks. In my case, I have a 'hybrid' prosthesis — the shaft is cemented into the femur and the acetabular unit has to wait for bone ingrowth before fixation. I was instructed to use crutches for at least six weeks. To be on the safe side, I stayed on crutches for eight weeks.

Journal: It would seem, Dr. Smith, that, after the operation, you were finally free from pain. There were no other side effects?



Dr. Dennis Smith six weeks following a double hip implant.

Dr. Smith: Actually there was another plus—in fact, a big plus. For years I had been on a tremendous amount of medication trying to control the arthritis. Once I was free from all the drugs, I felt so much better physically. We never realize the side effect from heavy medication until we stop needing it.

For years I had been on a tremendous amount of medication trying to control the arthritis. Once I was free from all the drugs, I felt so much better physically.

Journal: Are there prostheses in various sizes for different types of patients? Do they come in "small, medium and large"?

Dr. Smith: Good question. Originally, of course, that was one of the problems. Now they have different sets of lengths and sizes. There is an x-ray technique today which customizes the

prosthesis to the requirements of the bone.

Journal: We know now that the procedures are based on more than 30 years of experience, and we know you are more than pleased with your results. Tell us, do you see any big improvements coming, or is there really a need for improvement?

Dr. Smith: Yes, I think the materials could be improved. The cement could be better. Like all acrylic materials, there are problems in terms of fatigue and impact resistance. You can get fractures in the cement, and sometimes in the prosthesis itself. Fractures are minimized in the hip because the stresses are mostly compressive. Even though the cement works better under compression, there are still certain amounts of tension and shear. In the knee where you have much more complex stresses, it is more liable to break down. People are working towards developing a cement which has better fatigue resistance, more fluidity, and better adaptation capabilities.

Another potential problem concerns residual monomer. It can get into the bloodstream and cause a short term fall in blood pressure. This is carefully monitored during the operation. You can also get either air or fatty emboli when the prosthesis is placed. This has largely been overcome by putting a plug in the bottom of the medullary canal.

Journal: If any of us required an implant, would you, after your personal experience, recommend it today?

The surgery has improved my quality of life immensely. It is interesting how quickly the operation gained ground in the last 20 years. There are now about 15,000 a year in Canada and ten times more in the United States.

Dr. Smith: Absolutely! The surgery has improved my quality of life immensely. It is interesting how quickly the operation gained ground in the last 20 years. There are now about 15,000 a year in Canada and ten times more in the United States. The worldwide annual total is probably around 350,000 or 400,000. The vast majority of hip implant recipients will

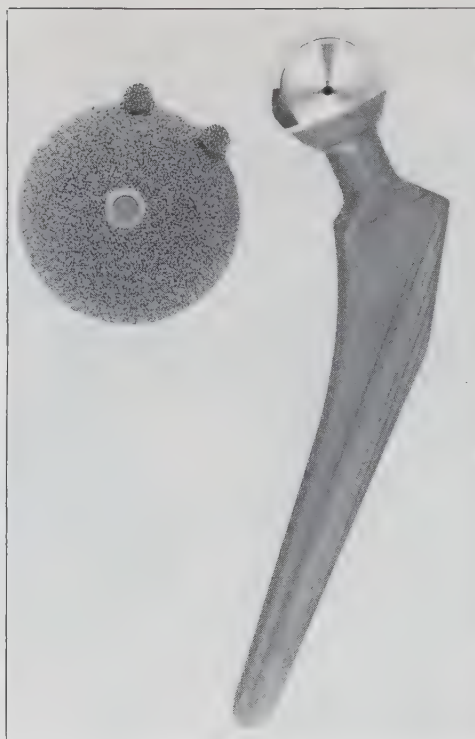


Fig. 1 — This photo illustrates Dr. Smith's hip prosthesis.

tell you that they would never hesitate to have the operation again; they are perfectly happy.

Journal: Dr. Smith, whatever the improvements in the future, hundreds of thousands of people around the world are indebted to you and your confreres for your contributions toward enhanced quality of life.

PART TWO

The Development of Bone Cement

Journal: Dr. Smith, how did you ever get involved with the development of a cement for hip implants?

Dr. Smith: In the 1950s when I was at the University of Manchester, (U.K.) Medicine and Dentistry were part of the same Faculty. One of my colleagues was Dr. John Charnley, an orthopaedic surgeon. He was very interested in materials and we often discussed the science of biocompatibility. He was the kind of person so engrossed in his work that he experimented with materials on a metal lathe in his home. He literally made some of his own instruments.

By the late 1950s Charnley had been replacing the heads of femurs for some time, but was unhappy with the results. Like others, he had been merely "jamming" the metal implant

into the prepared medullary canal and depended upon friction to hold them in place. Sensing there had to be a better method, the topic of a cement for 'grouting in' the hip prosthesis came up during one of our discussions.

The first cement we tried was dental stone because even then, I had some idea we might have a biodegradable material that eventually could be replaced by bone. Of course, what I didn't realize then, (I was pretty young and green in those days!), was that the setting of dental stone was retarded by blood and didn't set properly.

The first cement we tried was dental stone because even then, I had some idea we might have a biodegradable material that eventually could be replaced by bone.

Journal: Then how did you come upon acrylic cement?

Dr. Smith: It was actually based on what Dr. Charnley said he wanted. The requirement was for something that could set in about 15 minutes, was relatively non-toxic, was easily molded and could be forced into the medullary canal and remain stable for a long time in the body. It seemed to me that cold cured acrylic cement might fit the bill. I had completed my Ph.D. studying acrylic materials and was very familiar with both their basic science and practical aspects.

Journal: Did you use any particular type or brand of acrylic?

Dr. Smith: Interestingly, I chose one brand of repair acrylic we knew quite well. We had tested it and knew its monomer content and its working time. It seemed to be the one to fit the bill. Ironically, that particular material was called Nu-Life.

Journal: Had you and Dr. Charnley completed many laboratory studies on the material before actually using it on patients?

Dr. Smith: In those days we didn't have any Health Protection Branch or FDA, so Charnley just went ahead, found some patients and proceeded with the surgery. Most of those early cases were terminal patients. They were in poor shape and nothing else could be done. It was a last-resort type

of operation. The wonderful thing is that it worked!

He began by cementing the femoral prosthesis and then developed the acetabular polyethylene prosthesis as well. Originally he made the acetabular side of polytetrafluoroethylene (PTFE), believing it would have a low quality of friction, but the PTFE didn't work in a wear situation and tended to break down. Eventually he found that a high density polyethylene combination worked well.

Dr. Charnley was a very skilled surgeon; he was later knighted for his pioneering work.

Journal: How did you deal with the sterility of the repair acrylic in the operating room?

Dr. Smith: We bought the material in bulk and weighed it into a jar and then put some paraformaldehyde tablets into the powder. We reckoned the liquid was self-sterilizing. We placed 50ml of liquid into a screw-top jar and Dr. Charnley took those into the operating room. There were no incidents.

The slides I have of those early days are quite fascinating to the younger people of today. They say to me, 'Why is the cement pink?', not realizing that it was a denture repair acrylic.

Journal: Has the material changed much through the years?

Dr. Smith: Not really. It still has very similar working characteristics; the material remains dough-like for five or ten minutes. In the operation, the head of the femur is removed and the medullary canal is rasped out. The bone cement is mixed, taken up into a syringe and placed under pressure to get good contact with the bone. Today they put a plug in the bottom of the medullary hold to control the cement from going all the way down. It's similar to filling a root canal and placing a post and core.

Journal: Does it only work on cortical bone?

Dr. Smith: Most often, but it can also be effective in cancellous bone. Not only does the cement secure the prosthesis in place but it also distri-

Not only does the cement secure the prosthesis in place but it also distributes the load over a large area of bone. This is important – it acts as a load transfer agent right into the bone, both on the acetabular side and the femoral side.

butes the load over a large area of bone. This is important – it acts as a load transfer agent right into the bone, both on the acetabular side and the femoral side. That is the point of forcing the cement in under pressure with a syringe. The load is carried across the interface and you have remodelling of the bone similar to a dental endosseous implant.

Journal: With endosseous dental implants, there is an on-going discussion whether bone actually attaches to the titanium. What is happening with hip implants?

Dr. Smith: Around the early 1970s, it was discovered that if you had a porous surface on an implant, bone would grow into the pores if they were the right size. In fact, if it is porous metal or porous plastic, it is now known bone will grow into the surfaces. The pores are around 150 microns in diameter.

It is this concept of bone ingrowth into a porous surface which gives an alternative method of fixation. If the surface is porous, bone will grow into the pores and there will be biological fixation provided you keep it stable during the first two or three months. It's osseointegration – like an endosseous dental implant.

Another ironic touch to this story involves my colleague in the Biomaterials Department in Toronto, Dr. Bob Pilliar, Professor of Biomaterials*. He developed this porous surface concept when he was with the Ontario Research Foundation.

Another ironic touch to this story involves my colleague in the Biomaterials Department in Toronto, Dr. Bob Pilliar, Professor of

Biomaterials*. He developed this porous surface concept when he was with the Ontario Research Foundation. Both concepts are now available, the cemented and the porous, and that, in fact, is what I ended up with – a hybrid system using both concepts.

Journal: Why don't we have a cemented implant in dentistry?

Dr. Smith: It appears there just isn't enough room to get the cement into the mandible or maxilla. We tried it and failed. However, the porous surface concept does seem to work for a dental implant. At this moment we are developing a porous surface dental implant which we feel will be comparable to the Branemark device. It's the same idea; you have a root portion, you bury it and leave it covered for two or three months. The bone goes into the pores, and as it does so, into the screws of the Branemark type implant. The trick about the porous surface concept is that you get the fixation by bone ingrowth but you must not have any micro-movement or any significant loading during the bone ingrowth period. In orthopaedics, the big drawback is the patient has to be virtually non-weight bearing for at least two months. If you are only dealing with a single leg it's not all that bad – one can always hop around on crutches – but it is difficult when two hips are involved.

Journal: Are both you hip units the cemented types?

I had a choice of both concepts – the cemented and the porous. I wanted to get both hips done at once.

Dr. Smith: I had a choice of both concepts – the cemented and the porous. I wanted to get both hips done at once. It is technically very difficult to have both implants porous-surfaced at the same time because of the load bearing problem. Also, there are arguments for and against the cemented prosthesis for someone my age. I'm 62, but personally I don't consider that being 'old'.

For people on the borderline between young and old, who are relatively

*Dr. Pilliar is the author of an article in this edition of the Journal, entitled: *Dental Implants: Materials and Design*.

active and not very heavy, there is a 'hybrid' operation. It is a combination of the two systems. The femoral component, a titanium alloy, is cemented into place. The acetabular component on the other hand is a polyethylene cup with a porous surface titanium metal shell backing. This hybrid prosthesis is just coming into use. For people in my category, it is probably the treatment of choice.

Journal: What about hydroxyapatite prosthesis? We hear a good deal about them in dental implants?

One of the things research indicates is that probably all the hydroxyapatite really does is give faster bone ingrowth and faster apposition. There is no difference in the end with the support mechanism; the load is still being transferred through a rigid implant material to bone.

Dr. Smith: There are some companies selling hydroxyapatite-coated hip prostheses; they claim that there is bone ingrowth. However, one of the things research indicates is that probably all the hydroxyapatite really does is give faster bone ingrowth and faster apposition. There is no difference in the end with the support mechanism; the load is still being transferred through a rigid implant material to bone. Once you have your interface developed biomechanically, it is really a similar situation.

A researcher in our Toronto group, Dr. John Davies was recently recruited from England. You will hear a lot about him in the near future. He is a dentist and a cell biologist and his special area of research over the last years has been osteoblast colonization on different surfaces, including hydroxyapatite. He has shown that the osteoblasts certainly colonize hydroxyapatite more rapidly than most other materials. However, although he is supportive of the concept that hydroxyapatite is osteo-conductive, he does not feel it is osteo-synthetic.

Journal: So have we found all the answers?

Dr. Smith: We don't think all the answers are in yet. The big problem with hydroxyapatite coatings is that they seem to resorb. This may or may not be a bad thing but they don't necessarily seem to be permanent. The other, technical problem is bonding the hydroxyapatite to the metal — that has not been fully resolved.

Journal: In oral implants, they speak of ninety-plus per cent success rates. Do they use the same figures with hip implants?

Dr. Smith: The orthopaedic people have not been as obsessed with percentages as have oral implantologists. You don't necessarily get the same success rate with everybody, and the success rate of surgeons has improved as they have gained more experience. *The Orthopaedic Clinics of North America*, July 1988 issue, featured a symposium, "Is Acrylic Cement Obsolete?" Five or six studies were cited in which 15-to-20-year retrospective surveys showed success rates of around 80 to 85 per cent. With cementless prostheses, with only seven or eight years experience, the same ratio of figures is being claimed.

However, in most cases involving an orthopaedic hip joint, the patient is improved immediately both in terms of pain relief and being able to walk. Even if the case fails in five or seven years and a revision is required, many patients would be perfectly happy to have had seven years of being able to function.

Journal: If the case becomes mobile, does it mean a repeat of the operation to get another seven, even fifteen years? Is it that simple?

Dr. Smith: They revise the operation the same way as the original. The success rate for revisions isn't really known because many elderly patients die before they get to that point. Success rates for revision aren't expected to be as high because it is always technically more difficult. It is necessary to chip out the old cement and remove more bone. It is seldom as satisfactory as the first operation. There aren't very many good figures available but most surgeons would probably say the rate is lower — probably around 60 to 65 per cent.

PART THREE

What About Dennis Smith? (How Did All This Cement "Business" Get Started?)

Journal: How did you ever get involved with dental materials? You weren't trained to be a dentist.

Dr. Smith: It all goes back a long way. In England, in the early days, you could start as a Junior Lecturer at a very young age. My university career has indeed lasted a long time.

I started as a chemist at the University of London and earned an MSc in natural products chemistry — I was an organic chemist. I then went on to Manchester to obtain a PhD. In those days one could be a Junior Lecturer and complete a PhD at the same time, (something you can't but **should** be able to do in Canada). The PhD was in dental materials — acrylic materials.

In those days in England, when you studied chemistry, you did a fair amount of work on materials; phase diagrams on metals would be a good example. I had also worked during my holidays as a chemist in my hometown, so I was already familiar with physical testing on steel, iron and steel sampling, and some organic chemistry. I saw a position advertised for an Assistant Lecturer on Dental Materials; I applied and was appointed.

Actually, I could have taken dentistry because the Nuffield Foundation in England gave money to scientists to become dentists. I was taking the PhD and since I knew I wasn't really a clinician, I entered the field of dental materials which at the time was just opening up.

Journal: But how did you become so intimately involved with clinical dentistry?

Dr. Smith: One of those chance happenings, I suppose. Dental materials at Manchester was part of prosthetic dentistry and the professor in charge was a chap called Ernest Matthews. He was well known in England for his knowledge both in materials and prosthodontics. He had been a chemist before branching out into dentistry and was very sympathetic to the field of materials and was very supportive towards my work.

I developed a strong materials department over the years and advanced up

the academic ladder. I really never had much incentive to move on. Our department was one of the biggest and best in England at the time.

Interestingly, with the dental materials department as part of the department of prosthetics, my laboratory opened directly into the clinic. Naturally it involved me closely with both clinical practice and research. We had a very strong group at the time. Professor Matthews had some very talented people in his research area. It was really a very happy situation.

Journal: You did make several trips to North America in those early days though?

Dr. Smith: Yes indeed. In 1960, I was Visiting Professor at Northwestern University with Dr. Eugene Skinner. I think that year in North America unsettled me. By 1963 I decided we would leave England. I actually thought of going to Australia.

In 1968 and 1969, Toronto was developing its graduate school. They had recruited about six or seven professors. Dr. George Beagrie and Dr. Richard Ten Cate, both of whom became eminent Canadian researchers and educators, had preceded me.

Journal: How did you settle on Toronto?

Dr. Smith: In 1968 and 1969, Toronto was developing its graduate school. They had recruited about six or seven professors. Dr. George Beagrie and Dr. Richard Ten Cate, both of whom became eminent Canadian researchers and educators, had preceded me. I came across in March in 1969 to look around, give a lecture or two. By August I was here to live. It all happened so quickly.

Journal: When did you come involved with polycarboxylates?

Dr. Smith: ...About 1963. When I came to the States in 1960-61, the big discussion at the time was about adhesive restorative materials. It was about the time that Dr. Ralph Phillips had produced his pioneer work on micro-leakage using dyes and radio-isotopes. A workshop on adhesive dental

A workshop on adhesive dental materials, sponsored by the NIDR, was held in the States in 1961.

The workshop brought together many, prominent American scientists with dental research people. It was a sort of thinktank to try to develop a research program for adhesive dental restorative materials.

materials, sponsored by the NIDR, was held in the States in 1961.

The workshop brought together many, prominent American scientists with dental research people. It was a sort of thinktank to try to develop a research program for adhesive dental restorative materials. That, I think, was really the watershed that led to the

present-day acid etch situation.

Adhesives were just coming in and I came back from the States with ideas of adhesion for dental restorative materials. As a chemist, I approached it from a chemical point-of-view. Another chemist in my Manchester unit and I talked about the problem and tried a variety of different approaches.

Journal: When did you first hit upon polycarboxylates as viable material?

I first had the idea for the polycarboxylates in 1963 and we made the first practical material in 1964. That was when I took out the first patent - not in my name - but through the government agency that was used to patent university inventions.

The Hollenback Prize for 1990

It was only at the end of the interview process that Dr. Smith very modestly informed the Journal he had been awarded the prestigious Hollenback Memorial Prize for 1990. The CDA Journal is indebted to the *Journal of Operative Dentistry* for permission to quote excerpts from their March/April 1990 issue which reported on the presentation:

"The Hollenback Memorial Prize is awarded annually by the Academy of Operative Dentistry in honour of Dr. George Hollenback, a skilled and inquisitive dentist who believed that his profession could and should be improved through research efforts. He encouraged others to study materials, the methods of their use, and to seek new materials which would result in rendering improved service to our patients..."

... It is most appropriate that one of (Dr. Smith's) stature should receive many high honors. These include the Hinman Dental Leadership Medal, the Wilmer Souder Award in Dental Materials from the International Association of Dental Research, the Clemson Award to Basic Research in Biomaterials, the Mitch Nakayama Memorial Award from the Japanese section of the Pierre Fauchard Academy, the International Lecturer of the Year award from the Academy of International Dental Studies, and the distinguished Doctor of Science from the University of London for research in dental and biomaterials in 1979. He was the first Associate Member of the British Association and an honorary member of the International College of Dentists...

...There are few peers to Dr. Smith with his extensive research interests, his willingness to share his knowledge and expertise by writing and lecturing, his inventiveness, and his dedication to education."

Dr. Smith: I first had the idea for the polycarboxylates in 1963 and we made the first practical material in 1964. That was when I took out the first patent — not in my name — but through the government agency that was used to patent university inventions. If you were doing research supported by a government, as I was, (like the MRC here in Canada), the patent went to the government. The first material was marketed in 1968 under the name **Durelon**. The manufacturers are said to have made millions over the past 20 years.

Journal: Are we to assume that you too made millions?

Dr. Smith: No, emphatically no!... although I have been paid small amounts by the British government down through the years. In fact, after 17 years, the last of the polycarboxylate patents expired in April, 1989. When I was in England in June of that year, the British Technology Group — the government patent agency — gave me a testimonial dinner. It was a very nice affair. Many of my colleagues made speeches and the Vice-Chancellor of Manchester University and I were

presented with an engraved silver tray. I understand the British government had taken in five million pounds as its small share of the royalties. If I had patented **Durelon** myself I would be a very rich man today. But that's life!

I understand the British government had taken in five million pounds as its small share of the royalties. If I had patented Durelon myself I would be a very rich man today. But that's life!

Journal: We noted your excellent article in the special edition of the *American Dental Journal* in January 1990 which featured glass ionomers. Your work in that field, too, is commendable.

Dr. Smith: Glass ionomers were a natural development from polycarboxylates. My British colleague, Alan Wilson, had the idea of producing a glass powder instead of a zinc oxide. In fact, we actually had the same idea in my original patent for a zinc polycarboxylate cement; the first examples included glass powders. Wilson had more ceramic knowledge than we did and he

was the first person to make reactive glass that would work.

Journal: Dr. Smith, where do you see work in cements headed? What next breakthrough are you looking for?

I think if you can make a less water-sensitive material, particularly with these new light cure materials, it is the way to go. It would overcome the main disadvantage that sometimes leads to poor results in some hands.

Dr. Smith: We are looking for a material which is not so water-sensitive, for one thing. The diagrams in Rieffling's recent book, *An Atlas of Glass Ionomer Cements*, strongly emphasize the basic mechanics of water going in and water coming out, and the need for isolating the material for the critical setting period. I think if you can make a less water-sensitive material, particularly with these new light cure materials, it is the way to go. It would overcome the main disadvantage that sometimes leads to poor results in some hands. △

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CASE REPORT

Unusual Dental Calculus

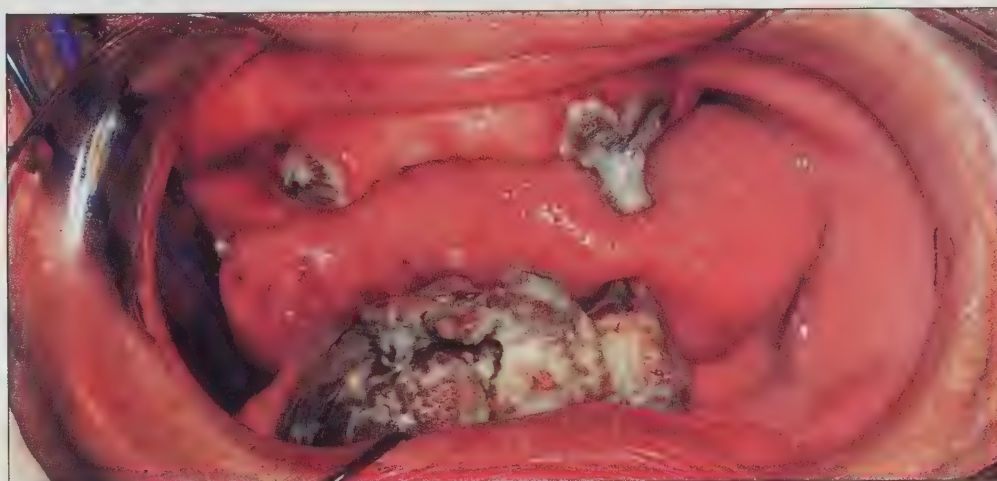
Lawrence G. Walker, BA, DDS
Vanier, Ontario

A 73-year-old Caucasian female presented on January 16, 1989 complaining of "a lump in my mouth which smells". A greyish foul smelling calcular body was observed in the anterior portion of the mandible. It was composed of several fragments and covered with plaque and debris. The entire mass was mobile, held in place by loose roots. The patient indicated she had not seen a dentist in over 30 years.

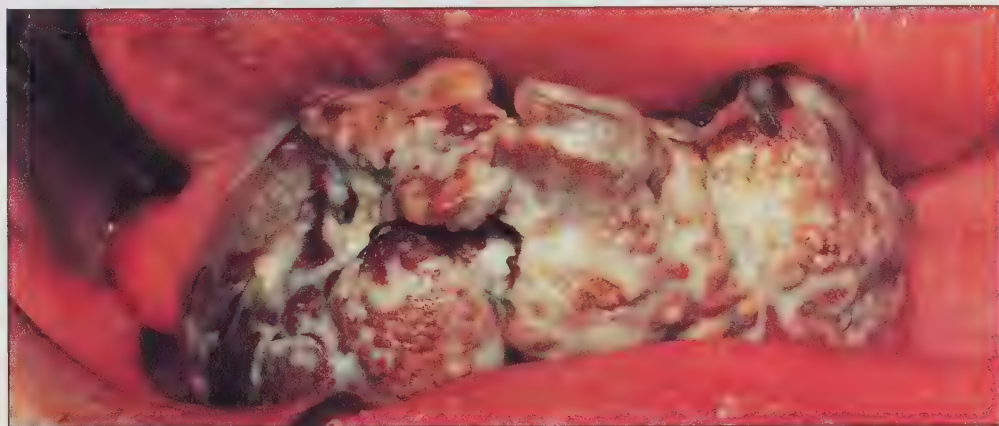
Due to diabetes mellitus, congestive heart failure and angina pectoris, the patient was admitted to Montfort Hospital in Ottawa on April 20, 1989. Surgery was performed under general anaesthesia.

The calcular mass was removed with the fingers revealing very inflamed and irritated gingival tissue. Root Nos. 42 and 43 came with the calculus and roots Nos. 13, 22, 23, and 33 were removed with forceps. All remaining teeth, including maxillary, were removed during surgery.

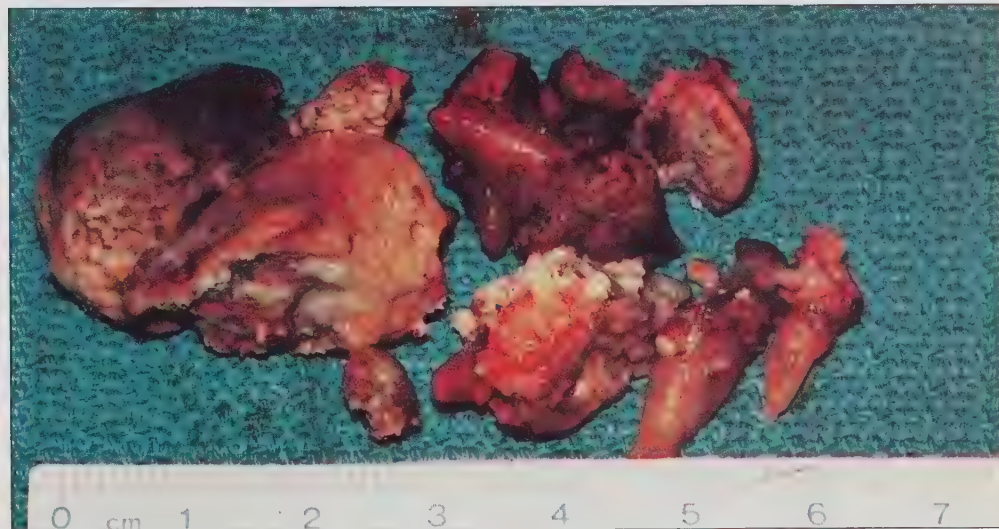
Post-operative treatment consisting of suture removal and verification of the healing process was performed in the dental office. All surgical areas healed normally. △



Calcular mass: 73-year-old patient who had not seen a dentist in over 30 years.



Close-up: calculus encompassing mandibular anterior teeth.



Post operative fragments.

EDITOR'S NOTE: Journal readers are encouraged to submit unusual clinical cases for publication. The text should not exceed one typewritten page double spaced and may include black and white or color prints and slides.

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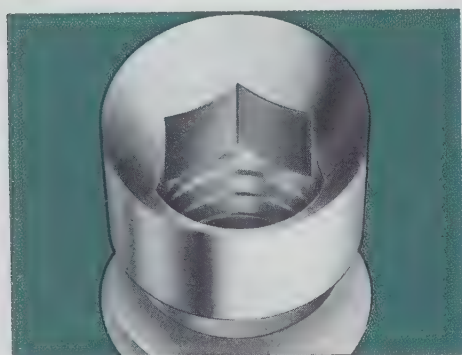
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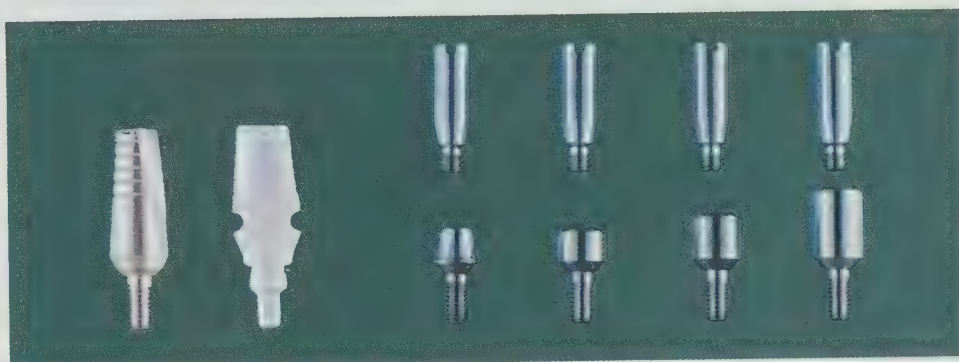
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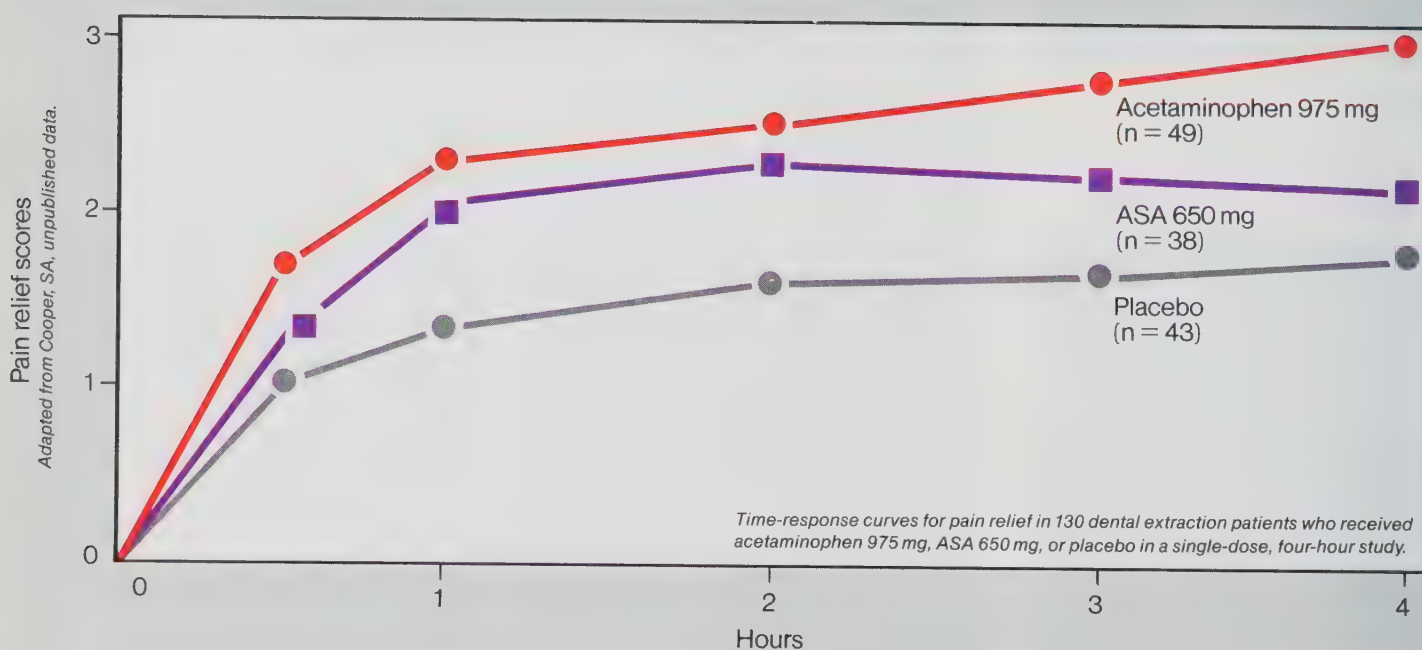


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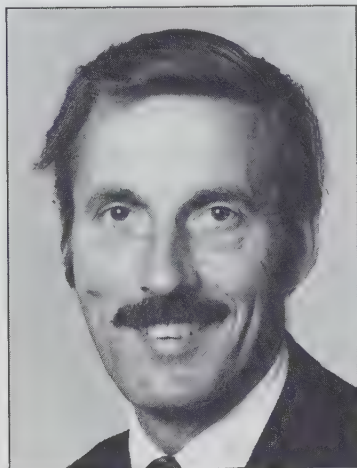
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Composite Restorative Materials

Derek W. Jones,
Division of Dental Biomaterials Science,
Dalhousie University.

Patients have become increasingly more concerned about their appearance in recent years as a result of various television soap operas projecting the "ideal lifestyle" in which all people are rich and good looking with a bright white tooth smile. Anterior teeth characterize a person's smile. This trend has placed an increasing pressure on the dental profession to provide tooth coloured restorative materials. The use of composites as the materials of choice as anterior restoratives is well accepted by the dental profession and is well supported by scientific dental research. The use of tooth coloured posterior restoratives is also becoming a much greater issue; patients regard the metallic hue of amalgam restorations to be far from aesthetic. The unreasonable adverse publicity given to the use of mercury in amalgam and the unscientific scare tactics of the media as well as some members of the dental profession have led to increased pressure to consider the use of alternative materials as replacements for posterior tooth structure.

About 120 years ago silicate cements were introduced to the dental profession as anterior restorative materials. These materials had excellent aesthetics and a very close match of thermal expansion to natural tooth. However, the problem of disintegration in low pH and the susceptibility to cracking due to drying out in the case of mouth breathers resulted in these materials being far from ideal. Silicate materials were however, very successful in minimizing the incidence of secondary caries at the margins due to the release of fluoride which had been incorporated by the manufacturer as a flux in the alumino-silicate glass. The fluoride provided an unexpected benefit which was not recognized until some years later. In the 1950's silicates were challenged by the introduction of the first acrylic resin restoratives, these were soon found to have deficiencies being too flexible, they had a high polymerization shrinkage and had a very low wear resistance. In 1962



Derek W. Jones

Bowen at the US National Bureau of Standards developed the first BISGMA resin composite system. Over a period of thirty years considerable evolution of these composite systems has taken place. In the development of the newer composite systems (filled resins) the aim has been to improve the mechanical properties, to lower the thermal coefficient of expansion, to lower the polymerization shrinkage, to lower the water absorbed, increase the adhesion between filler and resin matrix and to increase the resistance to abrasion, all of which will hopefully be manifested in improved clinical performance. The clinical performance of the early composite systems was characterized by excessive wear (Eames et al 1974). The current composite systems are very much improved over earlier materials however, these materials are still far from ideal. Improvements in composite materials have taken the form of the introduction of different glass and ceramic filler systems, the development of improved one paste photopolymerizing systems activated by visible light in which a light sensitive absorber such as camphorquinone is used together with an aliphatic amine accelerator. The use of these one paste systems has reduced porosity due to entrapment of air which would normally occur during mixing of a two paste system. The use of improved particle size distributions and filler shape has further increased filler

loading for posterior composites.

Modern dental composite materials are a blend of glass or ceramic particles dispersed in a polymerizable synthetic organic resin matrix. The polymer materials are blended together with the finely divided inorganic material such as a barium aluminosilicate glass or other glass compositions having an effective amount of radiopaque oxide that renders the resultant glass radiopaque to x-rays. A relative comparison of the particle size of modern dental composite systems is illustrated in Fig. 1. Lutz and Phillips (1983) classified the systems based upon particle size as either Conventional materials of relatively large particle size 50-70 per cent by volume [75-80 per cent weight], Microfilled materials 20-35 per cent volume [30-50 per cent weight] and Hybrid systems, 20-75 per cent volume [28-85 per cent weight]. The hybrid systems may have either a bimodal or in some cases a trimodal blend of particle size. The trimodal systems lend themselves to a greater density loading. A diagrammatic example of a trimodal system is shown in Fig. 2. The polymer matrix resin, the inorganic ceramic or glass filler and the interfacing silane coupling agent all play a significant role in determining the physical properties of the composite material.

Microfilled Materials

The microfilled system first introduced by Vivadent made use of the concept of dispersing a very small colloidal filler particle ($0.04\mu\text{m}$) into a pre-polymerized resin which was then ground into particles of less than $50\mu\text{m}$ in size and mixed into a paste with additional resin. The small particles are blended under vacuum with a resin system. The structure of a microfilled composite system is illustrated in the diagram (Fig. 3). Colloidal filler particles have a very large surface area of about $300\text{ m}^2/\text{gm}$ and have a very significant effect upon the viscosity of the resin system into which they are incorporated. Manufacturers add low molecular weight monomers in order to reduce the

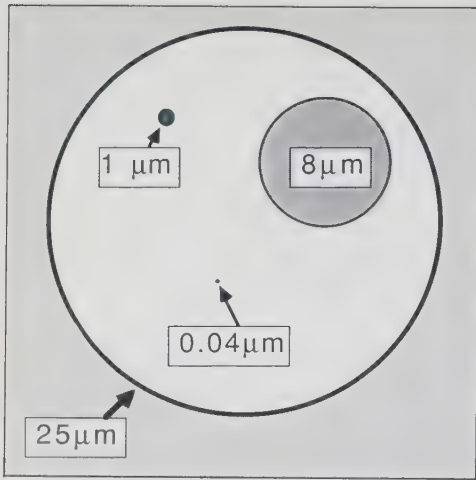


Fig. 1 — Relative size of inorganic filler particles used in composite materials.

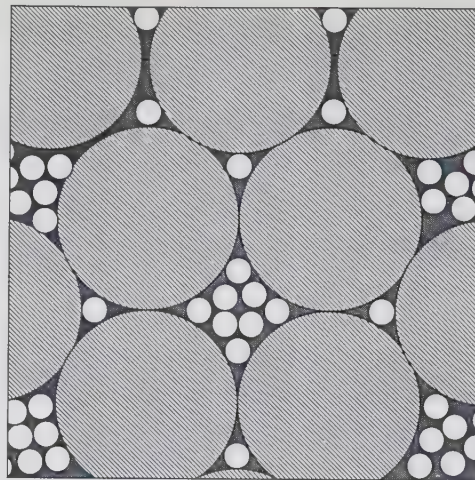


Fig. 2 — A two dimensional representation of a tri-modal particle size distribution for a (hybrid) composite material.

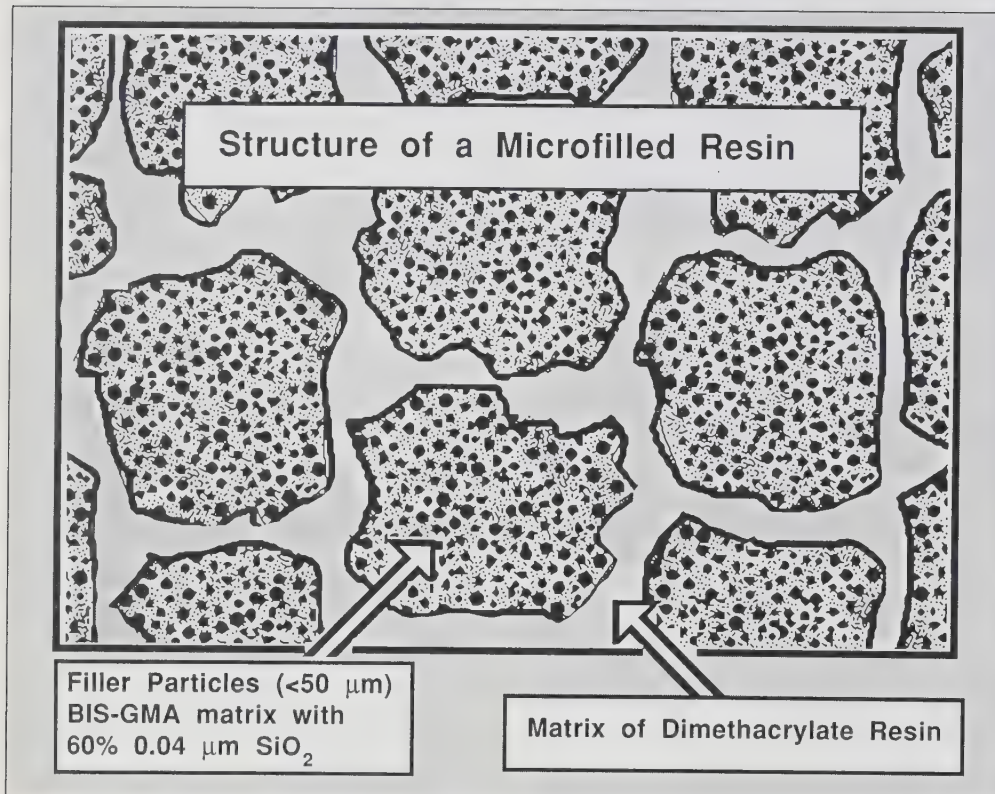


Fig. 3 — A diagrammatic representation of a microfilled composite resin.

viscosity but even with this treatment only about 25-40 per cent by weight of the very small filler can be incorporated whilst maintaining a clinically usable viscosity. The problem was overcome for the microfilled systems by polymerizing the submicron sized filler particles into a resin and then grinding the material into irregular particles of 15-50 μm size. The micro filled system can be finished to a smoother surface than the conventional systems due to the lower filler loading and the smaller filler size. However, the mechanical properties are generally less than for the conventional or the hybrid systems. We have recently shown that the percentage loading of the filler provides a strong correlation with elastic modulus values

(Jones et al 1990 a.; Rizkalla et al 1989).

White Light Systems

It has been demonstrated by Dogon (1985) that the visible light cured materials show less wear *in vivo* than chemically cured systems when investigated using a monkey animal model. Dogon's results may well be associated with less porosity and more effective polymerization of these white light polymerizing systems. The contraction force accompanying polymerization shrinkage of composite specimens has been measured for several commercial materials *in vitro* by Tani (1989). It was generally found that the newer

light curing materials produced the highest polymerization contraction force compared to the chemically cured type. However, the light curing materials are often used with an incremental build up curing technique and thus a simple clinical interpretation of this data may not be strictly valid. A bar diagram based upon this contraction force data is shown in Fig. 4. The higher polymerization shrinkage force may be due to the presence of greater percentage of lower molecular weight diluents or it may be due to the improved degree of polymerization achieved by the use of the white light curing system. Several investigators have suggested that composite restoratives placed into cavities which make use of dentine adhesion and acid etching of the enamel result in a strengthening of the teeth compared to the use of restoratives which do not bond to tooth substance. However, Causton et al (1985) using an *in vitro* study have suggested that cusps of molars and premolars undergo an inward movement of the order of 2 per cent over a period of a week. This was said to be due to polymerization shrinkage of the bonded composites. The 2 per cent movement was found to take place under both wet and dry conditions. The authors concluded that stress relief had taken place due to fracture of the brittle tooth enamel. The work by Tani (1989) dealing with polymerization force may well have some significance if it is related to stress relief fracture of enamel.

Fracture Toughness

One of the most important properties of materials which are placed into areas of high stress is that of fracture toughness. A comparison of typical fracture toughness values for a selection of materials relative to natural tooth is shown in Fig. 5. It should be noted that none of the materials have toughness values as high as natural dentine whilst all have values above that for tooth enamel. Smith et al (1983) have reported that the fracture toughness of the microfilled materials is, in general, lower than for the more highly filled composite materials.

Degree of Polymerization

The degree of polymerization for composite systems varies considerably in practice. The percentage of double bonds which may react will vary from as low as 35 per cent up to 80 per

cent (Ruyter 1985). The presence of unreacted double bonds on pendant methacrylate chains renders the materials susceptible to degradation in a moist environment. The degree of polymerization is clearly a major problem limiting the success of composite materials. The use of a higher percentage of small filler particles ($0.04\mu\text{m}$) will increase the opacity of the composite system since the particles have a size which is below the wave length of visible light (0.7m). Increased opacity of the composite will also reduce the effectiveness of the white light curing system and increase the percentage of unreacted double bonds.

Wear Resistance

Clinical results obtained with the use of dental restorative composite systems in posterior restorations have shown significant improvements in recent years, with the development of newer materials. Improvements have been demonstrated in the wear resistance of the so called hybrid composite systems (Leinfelder and Robertson; 1983). It should be recognized that resistance to wear is the one phenomenon which is the most difficult to evaluate in materials science. The mechanism of clinical wear is difficult if not completely impossible to replicate in the laboratory. However, some very sophisticated computerized *in vitro* methods are now being developed aimed at quantitatively measuring the wear of posterior restorative materials (DeLong et al 1985, 1989). Although the quality of clinical trials has significantly improved in recent years, we still have a problem since we do not fully understand the mechanism of clinical wear. Many experienced clinical researchers cannot agree as to which is the best method by which to evaluate the clinical performance of composite materials. Bayne (1989) has outlined the complex issues which influence the interpretation of observed wear rates of posterior composites. Wear rates vary with time depending upon tooth involvement, restoration size, operator effects and clinical procedures used. Leinfelder et al (1986) reported on the wear of nine different posterior composite systems after three years. A comparison was made between two different methods of evaluating the clinical wear. An indirect measure made on calibrated standard casts obtained at different periods of time indicated that the loss of height on the casts showed

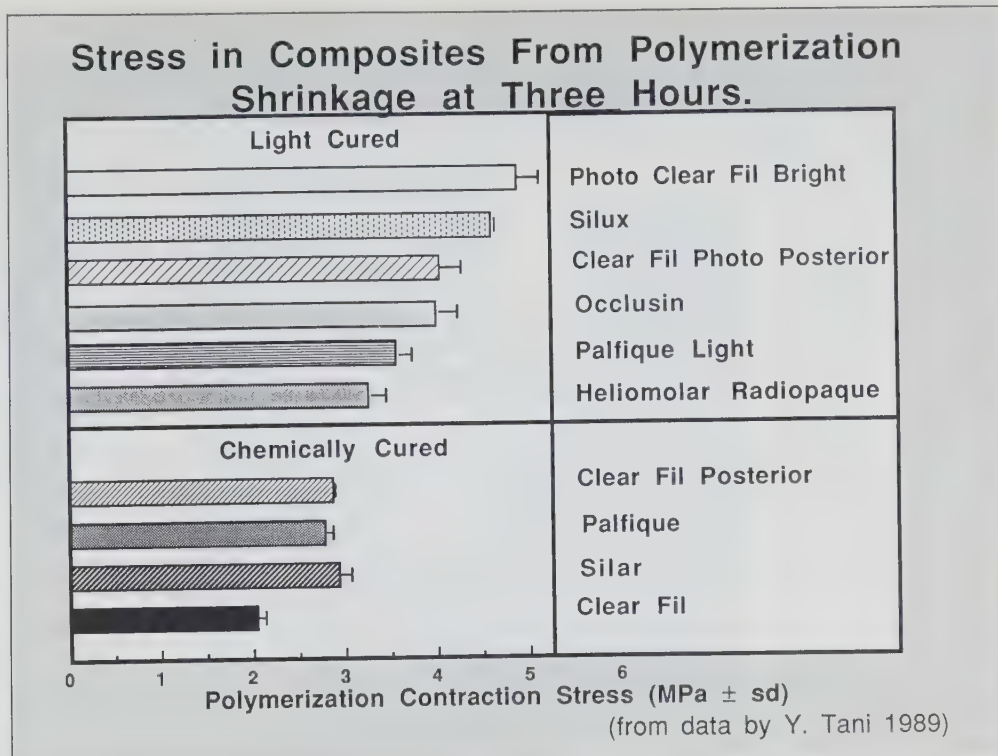


Fig. 4 – A bar diagram of the force accompanying polymerization shrinkage for light cured and chemically cured composite materials (after Tani 1989).

that the wear rate tended to decrease with time; in contrast, a more conventional study using the US Public Health Service System showed that the wear was in fact increasing with time. Further studies now tend to support the view that wear is rapid during the first six months and then decreases in rate over the next three to five years. However, one argument put forward against this interpretation is that the restorations may now be out of occlusal contact and are to some extent protected from further wear by surrounding wall of cuspal enamel. This could be true in the case of very conservative preparations. A major problem in drawing any meaningful conclusions from clinical wear data is the discrepancy between different studies conducted on the same materials by different research groups and the large standard deviation often observed for the data. Other researchers suggest that it is much more meaningful to measure the loss of volume of material rather than the loss of height of the restorative material. However, the ADA (1981) have set acceptance standards for composite materials that they should demonstrate less than $250\mu\text{m}$ in height over the first five years of service.

Clearly it is not a simple matter to evaluate and interpret the clinical performance of posterior composites in a

Typical Fracture Toughness Values

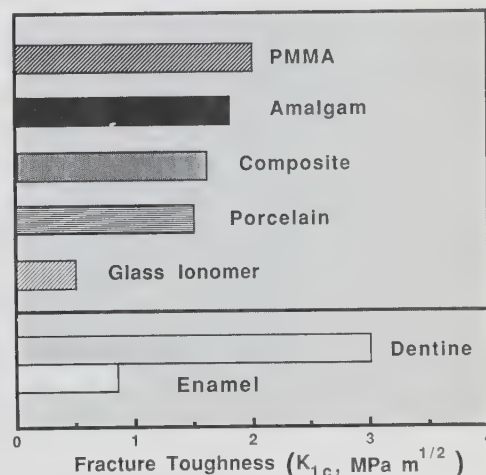


Fig. 5 – A bar diagram of typical fracture toughness values for various restorative materials and natural tooth.

scientific manner. The location size and shape of the restorations are bound to have a significant effect. Lutz et al (1984) have shown that restorations in molars wear more rapidly than in premolars. It has also been reported that the rate of wear of posterior composites may be related to the width and complexity of the restoration (Taylor 1989a, 1989b). Wear is not just simply related to occlusal stress since Kusy and Leinfelder (1977) observed that wear occurs generally over the entire

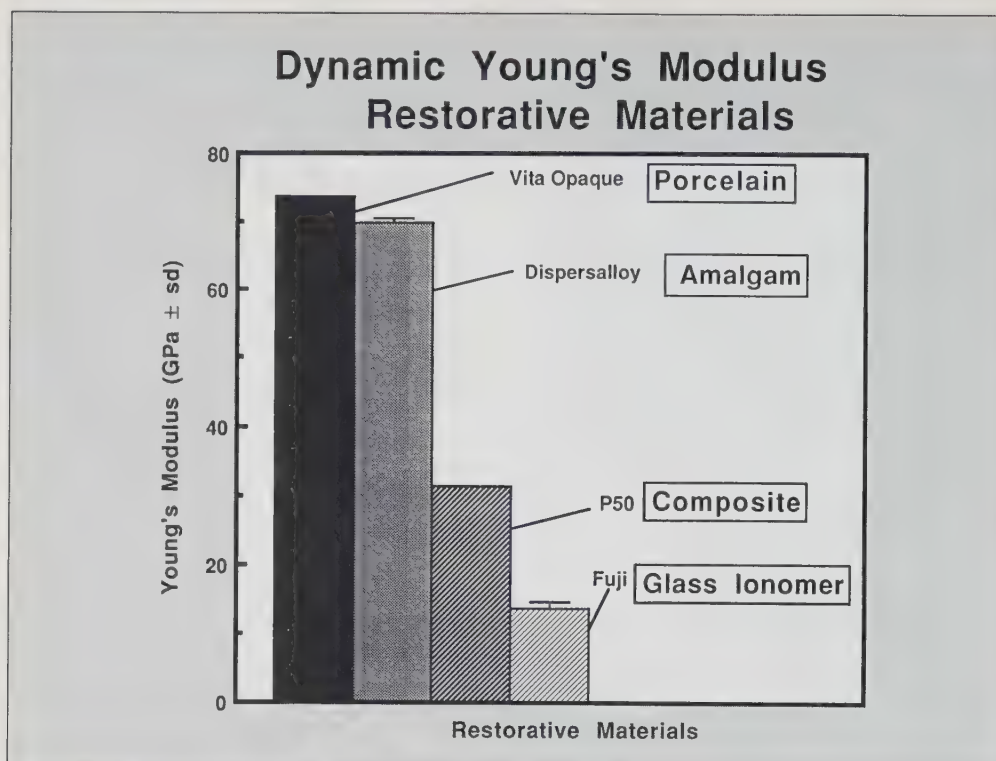


Fig. 6 — A bar diagram of the relative Young's modulus for various restorative materials.

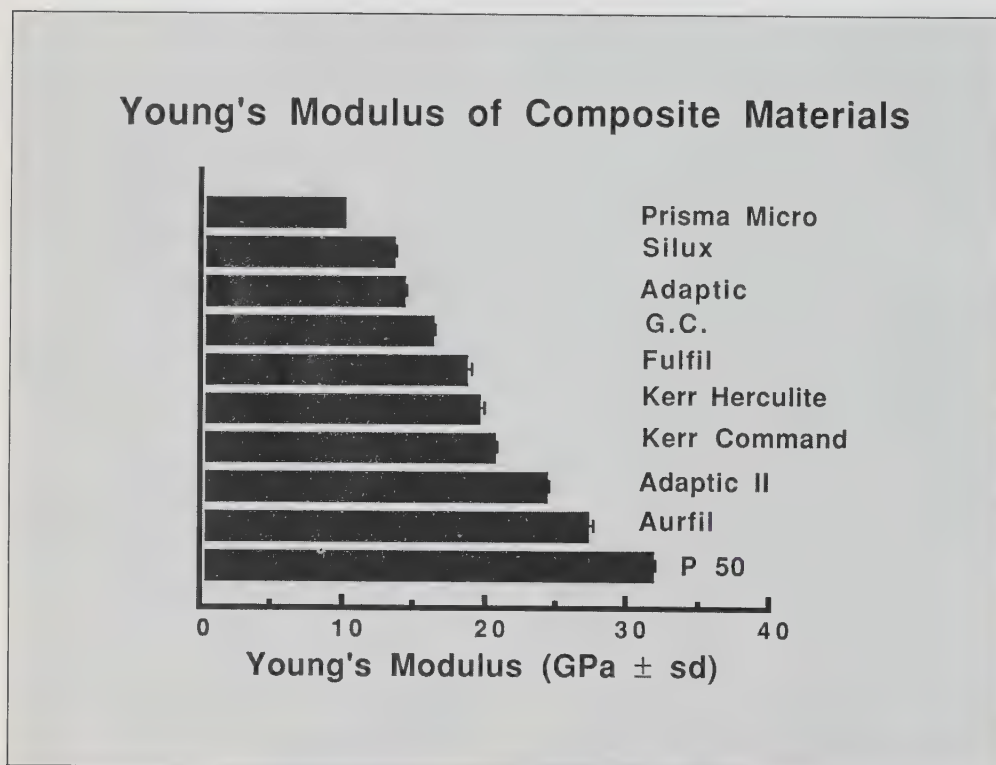


Fig. 7 — A bar diagram of the dynamic Young's modulus of ten composite materials (after Jones et al 1989).

surface of restorations not just in areas of occlusal contact.

The factors and properties which are believed to have a significant effect on the clinical behaviour of composites are: the placement, polymerization and finishing procedures, the elastic modulus, fracture resistance, wear resistance, fatigue strength, water sorption, and polymerization shrinkage.

Hybrid Composite Systems

The hybrid composite systems utilize in some cases a close packing tri-modal particle size distribution in which they have for example particles of the order of 10-20 μm blended with particles of about 2-5 μm and the interstitial spaces are then filled in with very much smaller particles of the order of about 0.04 μm . An example of a tri-modal

packing density system is shown in the diagram in Fig. 2. In practice the larger and intermediate sized particles would generally be irregular in shape and are only depicted as spheres in order to illustrate more clearly an example of the two dimensional packing of the particles.

Modulus of Elasticity of Composite Materials.

Evaluation of the modulus of elasticity of a composite material will show the effectiveness of the stress/strain transfer from organic resin matrix to the glass or ceramic filler particles. The modulus of elasticity and Poisson's ratio of dental restorative materials is also regarded as an important fundamental property, since a material with a low elastic modulus will more readily elastically deform under a given masticatory force. Excessive elastic deformation of the restorative material under functional stress may result in catastrophic fracture of surrounding brittle tooth enamel structure, or alternatively increased micro-leakage may result. The increased use of polymer/glass composite systems as posterior restoratives which will be subjected to much higher levels of force than anterior restorations, might suggest the use of materials with a higher modulus of elasticity in order to minimize the risk of cusp fractures. A comparison of the elastic Young's modulus of various restorative materials is illustrated in Fig. 6. It can be clearly seen that porcelain and amalgam are very much stiffer than composite materials and glass ionomer materials are less stiff than a hybrid composite material. A comparison of the Young's modulus of ten commercial composite materials is shown in Fig. 7. In general the higher the proportion of filler by weight the higher will be the elastic modulus. These materials have been tested in the dry state 24 to 75 hours after polymerization, thus the data provides base line data only. It would be expected that the moduli of elasticity of these materials would decline with the presence of moisture over a period of time. The Young's modulus of elasticity for these ten materials were all significantly different ($P < 0.05$). The values ranging from the lowest material Prisma micro to the highest P50. It is believed that the Young's modulus provides a reasonable indication of the potential clinical performance of materials when placed in high stress situations such as encountered in posterior restorations. In

contrast to the Young's modulus values of the ten materials, **Fig. 8** shows a comparison of the specific gravity of the same materials in the same rank order indicating that there is less difference in density than in the relative moduli of these materials. Differences in the values for the two rankings may be associated with better bonding between the filler and matrix resin or the presence of a higher percentages of low molecular weight resins in some cases or perhaps a lower degree of polymerization has been achieved. The effectiveness of the silane treatment or the presence of porosity can also play a part. Excessive wear of the restoration due to loss of filler particles followed by easier wearing away of the softer resin matrix may occur more readily in situations in which incomplete polymerization has taken place.

Silane Coupling Agents

Silane coupling agents are applied as a thin uniform layer to the surface of the filler particles. This provides sites for the chemical bonding of the silane and organic matrix and between the silane and the silicate filler. The diagram in **Fig. 9** illustrates the silane coupling agent between filler particle and resin matrix. Recent work in our research laboratory (Jones et al 1990 a.) has been able to demonstrate (using an ultra sonic method) increased modulus of elasticity for experimental composites in which the silane coupling agent was present, compared to materials containing an untreated filler. Many of the currently used, dental composite systems suffer from lack of sufficient adhesion being established between the inorganic (glass or ceramic) filler and the resin matrix.

Resin Matrix Material

The modulus of elasticity of a composite material can be influenced to some extent by the resin matrix material itself. The BISGMA monomer used in many commercial composite materials produces a fairly stiff polymer due to the bulky phenyl rings in its backbone and the considerable hydrogen bonding between the molecules. As a result this type of monomer has a very high viscosity and manufacturers incorporate low viscosity monomers (diluent) to increase the wettability, flow and ease of placement. The greater the proportion of low molecular weight diluents incorporated into a resin material the higher will be the polymerization

Specific Gravity Composite Materials

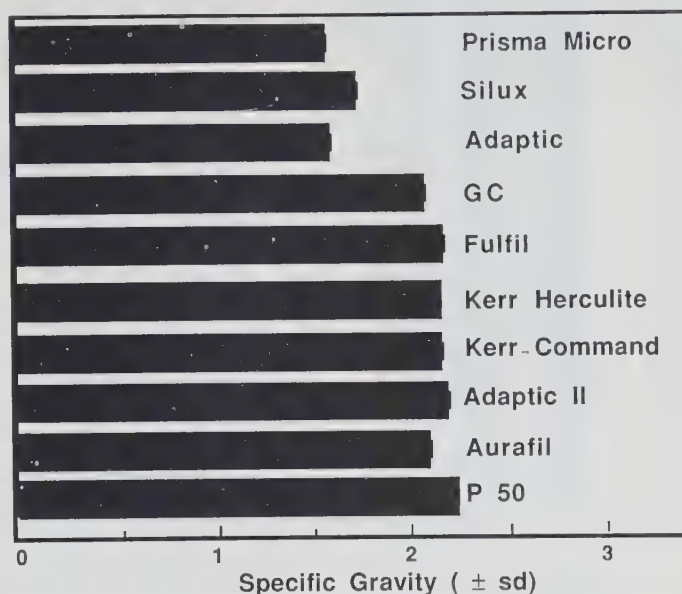


Fig. 8 — A bar diagram of the specific gravity of ten composite materials, the rank order is the same as that for the Young's modulus values shown in figure 7 (after Jones et al 1989).

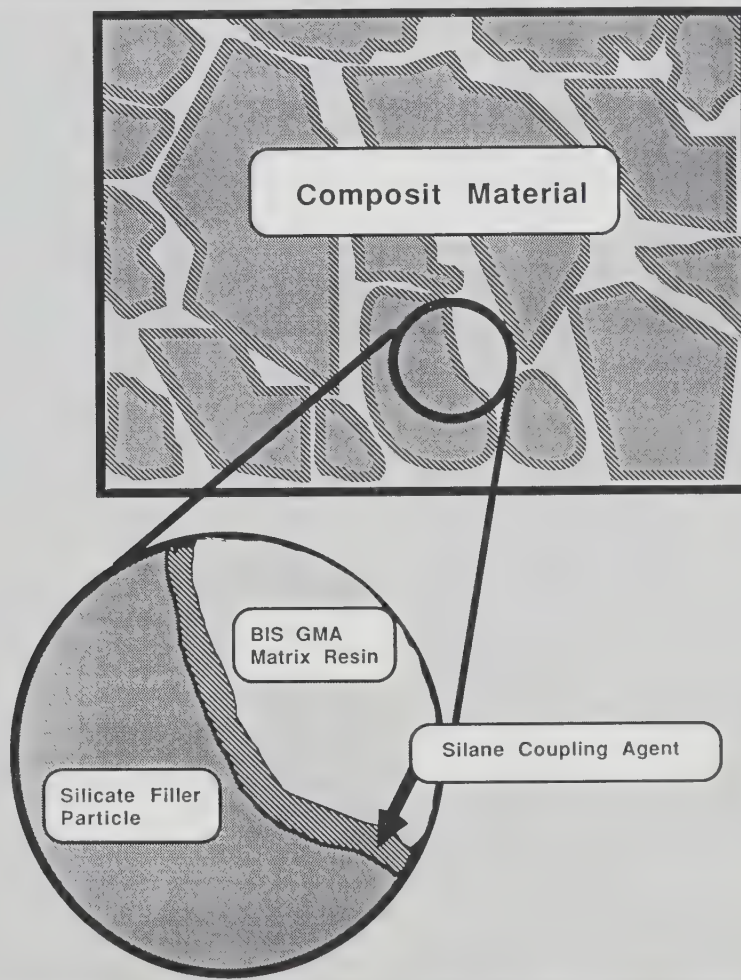


Fig. 9 — A diagrammatic representation of silane coupling between inorganic filler particles and organic matrix resin.

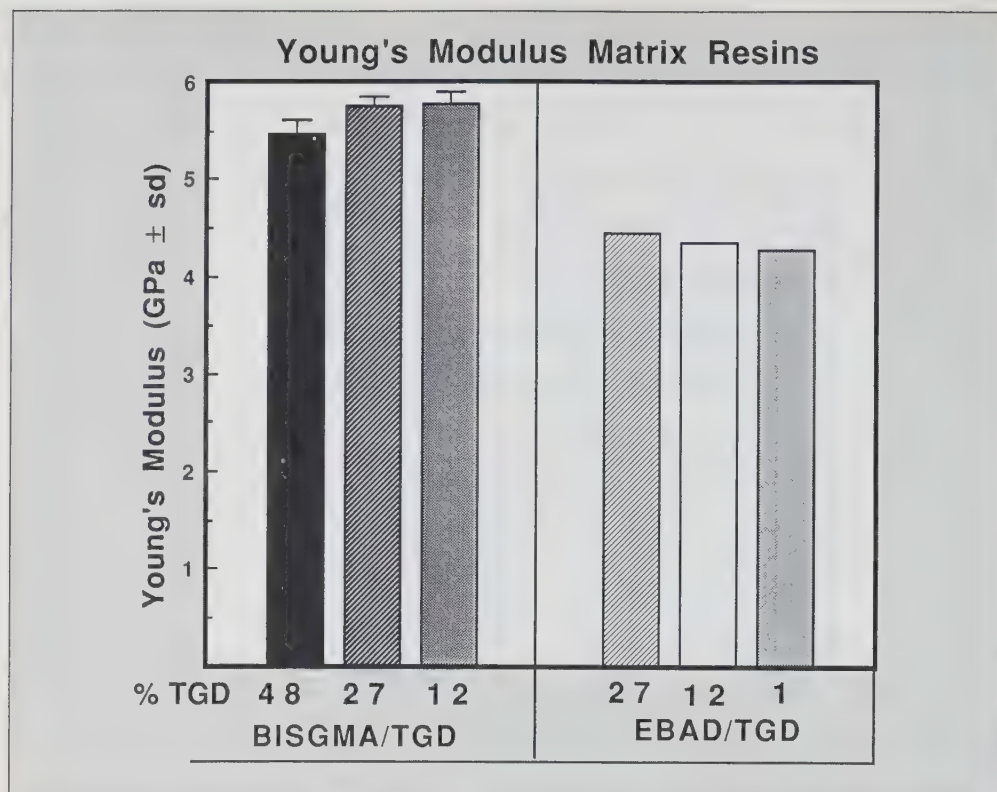


Fig. 10 — A bar diagram of the Young's modulus of BISGMA (Bis phenol-A Glycidyl Methacrylate) and EBAD (Ethoxylated Bisphenol A Dimethacrylate) polymers with varying amounts of TGD (Triethylene Glycol Dimethacrylate) diluent.

shrinkage and a tendency to lower the modulus of elasticity. We have recently reported on the modulus of elasticity of BIS GMA and BIS GMA/low molecular weight mixtures (Jones et al 1990 b.). A comparison of the relative dynamic Young's modulus for some dimethacrylate materials is shown in Fig. 10. The influence of the diluents on modulus is not as great as might be expected. This is believed to be due to the increased degree of polymerization which occurs in mixtures of BISGMA and the TGD diluent (Ferracane and Greener 1986).

Conclusions

It is generally accepted that composite materials are in no way acceptable as universal replacements for traditional amalgam or cast posterior restorations. Recent estimates have indicated that some 16 per cent of posterior restorations being placed are composites compared to 84 per cent amalgam. The public is constantly confused and frightened by pronouncements made by certain individuals and organizations about the toxic effects and suggested disease link with mercury from dental amalgam. While there is no scientific evidence to support such claims made by certain vocal individuals or groups, the public are frightened by such scare tactics fuelled by media sensationalism.

The public will increasingly demand that the dental profession reassess the use of amalgam even though it is recognized as an effective and low cost material. This situation puts increasing pressure on the need to develop improved and effective biomaterials for dental restorations. Significant improvements have taken place in the development of composite materials in the past few years. However, further improvements in dental composite materials are required in order to produce a significant impact to allow this important class of materials to be used more extensively in restorative dentistry.

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Dental Implants: Materials and Design

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ABSTRACT

The use of endosseous dental implants represents one of the most rapidly expanding areas of dentistry. This article attempts to summarize the current understanding of factors affecting dental implant success. The need continues for further fundamental studies to provide a base for future improvements in the design and use of dental implants.

SOMMAIRE

En médecine dentaire, on effectue de plus en plus d'implants dentaires endosseux. Aussi est-ce une des techniques qui se développe le plus rapidement. Dans cet article, on tente de résumer ce qu'on sait actuellement des facteurs qui peuvent assurer la réussite des implants dentaires. Il faudra poursuivre les recherches fondamentales afin de déterminer les éléments pouvant améliorer à l'avenir l'utilisation de cette technique.

The use of dental implants has grown rapidly during the past five years or so. An important factor contributing to this rapid growth was the encouraging reports by Branemark and co-workers in the late 1970's and early 80's of their clinical experiences with threaded titanium implants.^{1,2,3}

The high success rates reported (> 90 per cent in mandibular sites and > 80 per cent in maxillary sites for individual fixtures in function for periods greater than 15 years) enhanced the degree of credibility for the clinical use of dental implants. The reports were timely occurring just after the NIH Consensus Development Conference⁴ that critically reviewed the clinical experiences with the better known dental implants at that time (but, interestingly, not including the threaded titanium implants developed by Branemark and co-workers). The



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consensus reached at that meeting was that clinical success of dental implants should be defined by a failure rate over a five-year period of less than 25 per cent for functioning implants. The reports by the Swedish investigators rapidly outdated this recommendation!

With the introduction of an apparently successful dental implant system, it did not take long for a number of similar designs and procedures to appear in the marketplace despite any real scientific understanding of why the Branemark implant was so successful. As a result, dentists soon became overwhelmed by reports proclaiming one system superior to the others, again based on little scientific fact. Because of the recognized need for a better foundation on which to build further improvements in the design and use of dental implants, a number of research groups in different centers around the world are currently involved in both basic and applied studies related to the use of dental implants.

Much of our current knowledge related to the design and use of endosseous dental implants comes from studies of tissue-biomaterial/implant interactions in general. The requirement of "biocompatibility" has been recognized as a necessary property for success of any surgical implant (including

dental implants). There has been considerable research devoted to developing an understanding of what determines biocompatibility of a material and/or implant with many international meetings and publications focussing on this issue.^{5,6,7} It should be noted that not just the materials used for implant fabrication but also the design of the implant will determine the overall tissue response to that implant. For example, bone loss can occur around an implant made from a biocompatible material if the implant is too stiff, as determined by its design parameters, resulting in unacceptable mechanical loading (abnormally low forces) on the bone next to the implant. In addition, implant success is always conditional on proper implantation procedures and patient rehabilitation regimes being followed. The best biomaterial and implant design can be made to fail through improper use!

Branemark claimed that success of the dental implant developed by his group depended on establishing rigid fixation of the implant in host bone (so-called "osseointegration").^{1,2} Few would argue with this claim based on current knowledge. "Osseointegration", according to Branemark, can be achieved by: i) the use of appropriate surgical techniques (two-stage, atraumatic surgery), ii) suitable implant design (c.p. titanium, threaded shapes) and iii) proper patient selection and rehabilitation. The use of a two-stage implantation procedure that allowed bone to form in close apposition to the implant surface prior to its being placed in function was considered a necessary condition for success. Premature function could result in excessive movement of the implant relative to its host bone during the early healing phase and this could result in the formation of fibrous tissue rather than bone in close apposition to the implant surface. This has been demonstrated to occur both with dental and orthopaedic implants.^{8,9} The

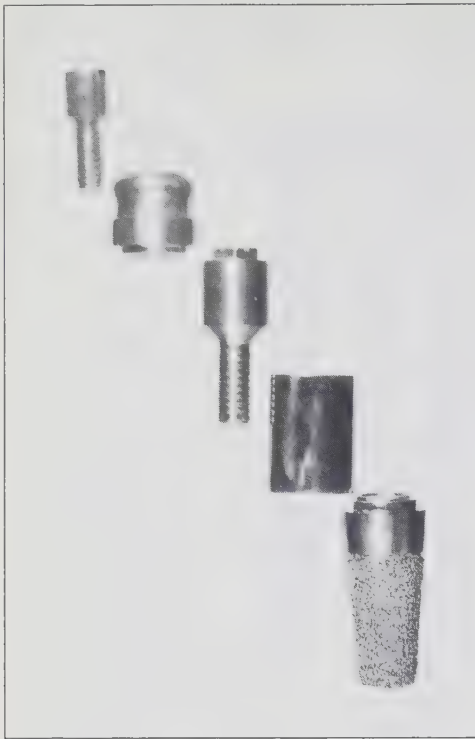


Fig. 1 — Porous coated Ti6Al4V endosseous dental implant currently in human clinical trial.
A — Intact implant: B — Exploded view — show the components of this two-stage implant.

use of a two-stage implantation procedure to avoid excessive early movements of implant relative to bone as suggested by Branemark was innovative and probably contributed more than any other factor to the success of the threaded titanium implant. Without exception, all currently-used endosseous dental implants rely on a period of non-function to allow bone to form close up to the implant surface. However, a quantitative understanding of the effect of micromovement on bone formation at the implant-tissue interface is lacking. It is known that movement can affect bone cell formation and activity (based on studies of fracture healing¹⁰ and bone ingrowth into porous-coated orthopaedic implants¹¹) but very little information is available on the maximum amplitude of relative movement at the implant-tissue interface that can be tolerated without inhibiting bone formation in close proximity to the implant surface.¹² This has limited our ability to design easier-to-use implants, an obvious objective for the safe and efficacious use of dental implants by a wide sector of dental practitioners. The currently accepted approach to dental implants is to be as conservative as is economically practical in terms of their design and use. This is totally in keeping with the procedures outlined by Branemark et al¹ nearly 15 years ago.

As well as a two-stage approach, Branemark advocated a careful, atraumatic-as-possible preparation of

the implant site. This would result in bone formation in close apposition to the threaded implant surface in the shortest time thereby ensuring 'osseointegration' by the end of the stage 1 period (typically three to five months). Some researchers have suggested the use of shorter periods for the first stage with certain implant designs.^{13,14} Studies have shown that different designs and possibly materials can affect the rate of bone formation at implant surfaces as well as the sensitivity of the response to relative micromovement.^{15,16} This is discussed further below and is an area where further studies are required to provide basic information on the effect of surface characteristics (chemistry and topology) on the healing response.

Current Dental Implant — Materials and Design

Metals (cp titanium and Ti6Al4V alloy) and ceramics (polycrystalline and crystal Al_2O_3) are used to-day for fabrication of most endosseous dental implants for human clinical use. Additionally, calcium phosphate (nominally calcium hydroxyapatite — $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$) is used to form so-called 'bioactive' surface coatings on some implant designs. The term 'bioactive' is not well defined at present but it generally is considered to describe the ability for forming direct chemical bonds between bone and the implant.

The concept of strong chemical bonds forming at hydroxyapatite-bone interfaces is based primarily on transmission electron microscopic studies showing apparent epitaxial matching at the atomic level between hydroxyapatite and juxtaposed mineralized tissue,^{17,18} as well as many transmitted light microscopic studies of bone-implant interfaces.^{19,20} However, a recent study by Davies et al has shown that similar close contact can occur between mineralized nodules grown in vitro on Ti substrates so that the unique 'bioactive' character of hydroxyapatite is not at all confirmed.²¹ Further, there is little published information confirming the formation of a strong interface bond as determined by *tensile* strength testing of the interface between bone and hydroxyapatite although at a recent Society for Biomaterials meeting, evidence for such bonding was presented,²² indicating the need for further investigations of this issue. However, experiments have confirmed the osteoconductive nature of hydroxyapatite,²³ an important characteristic in promoting *faster* bone coverage of an implant surface.

These plasma-sprayed, 'bioactive', hydroxyapatite coatings are 50 to 100 microns thick and are formed by plasma spray deposition of calcium phosphate onto specific regions of Ti or Ti alloy implants.^{24,25} Another issue that has yet to be properly addressed is the exact nature (chemistry and structure) of the coating that results after plasma spray deposition of hydroxyapatite powders. Plasma spray deposition involves the injection of powders into a hot plasma arc causing melting of the particles in a very short period during their transport through the hot plasma and deposition as molten particles onto a titanium or titanium alloy substrate that remains relatively cool during this process. The deposited particles are rapidly cooled at a rate greater than one million centigrade degrees per second, and solidified on the metal substrate. The volume shrinkage that occurs during the solidification as well as further shrinkage due to cooling to room temperature results in tenacious mechanical bonding of the ceramic coating to any metal substrate surface asperities as the ceramic layer contracts around these surface features. It is for this reason that the metal substrate must be prepared with a certain surface roughness which is typically 1 to 3 microns prior to the plasma spraying operation. Although some chemical

reaction might also contribute to interfacial bonding after plasma spraying, it is generally accepted that the major component of the bonding is mechanical.²⁶ Because of the high temperature conditions that the starting hydroxyapatite particles are subjected to during coating, it is possible that the deposited layer will be somewhat different than the starting powders both in terms of chemical composition and structure. A recent report has indicated that for hydroxyapatite coatings, although the crystallographic structure of the coating is similar to that of the starting powders, crystal size is much finer.²⁷ However, even so, the possible formation of some trace amounts of other phases cannot be wholly discounted. This is of some concern since chemical composition and structure will determine the bioactivity and biodegradability of calcium phosphate.²⁸ It is highly unlikely that a coating will consist wholly of stoichiometric hydroxyapatite (Ca:P=1.67) despite the use of such starting powders. Some reports of long term *in vivo* use of 'hydroxyapatite-coated' endosseous dental implants (animal studies), have suggested that these coatings do degrade and are resorbed over time with virtual complete loss of a 40 micron or so coating being reported over 18 months of implant function in one study.²⁹ Further studies to clearly demonstrate the efficacy of calcium phosphate plasma-sprayed coatings is required although the human clinical use of various proprietary coatings on dental implants is ongoing and information should be gained from patient follow-up. However, it should be noted that this is not the recommended method for assessing new materials or designs!

In addition to these 'bioactive' ceramic coatings, titanium plasma-sprayed coatings are deposited onto some Ti implants in order to form an irregular surface that will allow bone ingrowth into surface irregularities. This will result in mechanical interlocking of bone and implant to achieve rigid implant fixation.^{30,31} Porous surface coatings to achieve rigid implant fixation by bone ingrowth into a three-dimensional interconnected pore network are also being used,^{32,33} and while these designs offer potential advantages in terms of ease of placement and bone healing response,³⁴ they have not yet had a history of lengthy *in vivo* use. Both the irregular-surfaced, plasma-sprayed designs and the porous-coated implants must be carefully designed to

avoid greater vulnerability to bacterial infection, because of the irregular or porous surface geometry.³⁵ Although stainless steel and Co-based alloys as well as vitreous carbon have been used for the fabrication of dental implants, these are not common to-day because of limitations in terms of chemical stability,³⁶ (higher corrosion rates for stainless steel and Co-based alloys compared to titanium and its alloys) and lower fracture resistance of carbon. Other materials that are currently being evaluated in human clinical trials or animal studies include partially stabilized ZrO₂,³⁷ (because of its higher fracture toughness compared with Al₂O₃), bioglass-coated metal implants, the metal substrate being made of an Fe-Cr-Ni-Co alloy,³⁸ porous polysulfone-coated titanium implants³⁹ porous alumina-coated sapphire core implants,⁴⁰ and novel composites⁴¹ that offer the potential of being mechanically more compatible with bone (i.e. Young's modulus similar to that of cortical bone).

A summary of different implant designs and their effect on long term tissue response has been presented recently by Brunski.⁴² An important consideration for the long term success of dental implants is the effect of the design on bone remodelling around the implant. Obviously excessive bone loss is unacceptable since this can lead to greater susceptibility to infection as a pocket develops around the coronal portion of the implant followed by implant loosening. Crestal bone loss has been observed to a degree with all currently-used implants but it appears that the extent of bone loss is limited with higher rates of loss occurring in the first year or so (1.3 mm/yr) but much lower rates (0.1 mm/yr) occurring subsequently.⁴³ The cause of this initial bone loss is generally attributed to very high stresses occurring in the bone next to the coronal portion of the implant. This conclusion is based on finite element stress analysis of models representing the implant and surrounding bone. It should be appreciated that many assumptions and oversimplifications must be made in these studies. This prevents a real understanding of how local mechanical stresses acting on the bone affects remodelling. In our own studies on porous-coated Ti alloy implants, limited crestal bone loss has also been observed but never beyond the porous coating junction; but we believe that with this design bone loss occurs because of abnormally low

crestal bone stresses leading to bone resorption because of disuse atrophy.^{44,45} Further studies on the long term aspects of endosseous dental implants and the possible effect of design differences is required.

There also appears to be a significant effect of implant design and, specifically, the surface topography on the early tissue healing characteristics. A study by Maniopoulos et al¹⁵ showed that for conditions of early implant loading, a porous-surfaced implant appears to elicit a significantly different response than a threaded implant design. The porous-coated implants used in that study were observed to develop strong bone-implant bonding despite the imposition of early function while threaded implants under similar loading conditions went on to develop a progressively thicker fibrous tissue encapsulating layer and loss in implant support. This result suggested a possible advantage for a porous-coated endosseous implant and formed the basis of our programme on dental implants.⁴⁵ This study has resulted in human clinical evaluation of the implant seen in Fig. 1 with encouraging results, at least for cases studied to the present (over one year in function).⁴⁶ The main conclusion from animal studies of porous-coated dental implants is that, provided some fundamental criteria are adhered to during implant placement, (avoidance of excessive early micromovement and no exposure of porous-coated regions to the oral cavity), such implants appear to be at least as successful as threaded designs despite the much simpler surgical procedure used for placement of the porous-coated implants. Further, the results of those studies suggest that porous-coated implants could be made shorter than threaded implants and still develop equivalent fixation.⁴⁷ Based on the early function studies by Maniopoulos et al,¹⁵ this design is expected to perform better in situations where some limited micromovement of the implant relative to the host bone occurs (as for example with fresh extraction site implants). Studies are in progress to examine this possibility.

Although proper material and design selection is important for the success of dental implants, success is equally dependent on acceptable prosthodontic treatment. However, this subject is beyond the scope of this article and it is noted only to present a complete overview of the factors that are impor-

tant for the successful use of dental implants.

Summary

A number of common features appear with all successful dental implants in current use. These include: i) the use of biocompatible materials, ii) the need for a period of nonfunction, (or limited function), to allow rigid implant fixation to occur (so-called 'osseointegration'), iii) a design to avoid chronic bone loss because of mechanical, biochemical or other factors. There is no clearly superior dental implant design to-day. An objective of researchers remains the development of an implant that can be placed using simpler procedures in a shorter time (for the benefit of both the patient and dentist), is reliable and capable of use in demanding situations (for example, with limited available alveolar bone height), and is relatively inexpensive making it more universally available. Continued basic and applied studies are essential for these objectives to be met.

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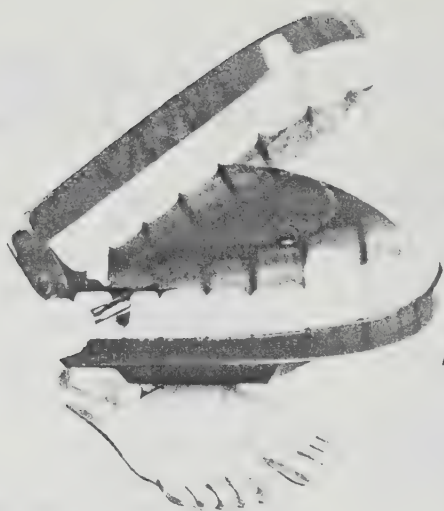
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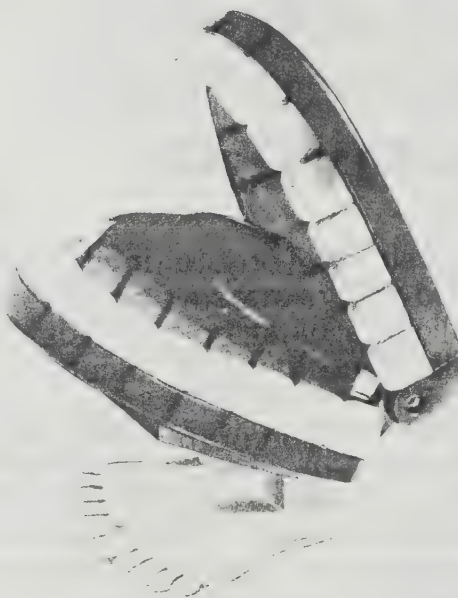
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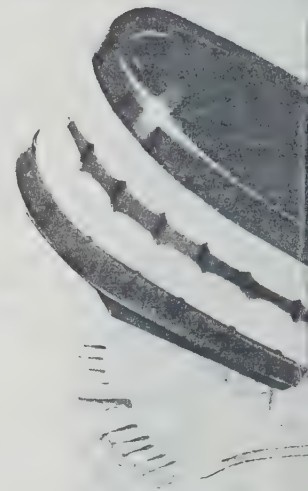
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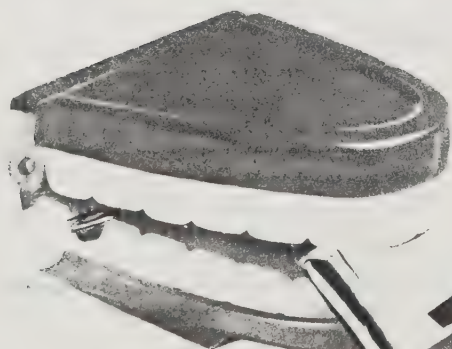
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What dental phobics say about their dental experiences

Andrée Liddell, PhD
Cheryl Ackerman, PhD
David Locker, DDS, PhD
Toronto

ABSTRACT

Previous surveys have indicated that there is a substantial proportion of dentally anxious individuals in the general population. Many of these individuals avoid contact with dentistry as much as possible, while fearful individuals who present themselves for treatment are probably too uncomfortable or too afraid to make their views known. Consequently, a study of the feelings and attitudes of a group of dental phobics was carried out as part of a larger study of the efficacy of psychological treatments for excessive dental anxiety. The subjects were recruited by means of a newspaper advertisement and asked to complete a questionnaire designed to obtain information regarding their dental experiences and attitudes. Twenty-three individuals provided enough data for analysis. They were distributed widely in terms of age, education, income levels, and general fearfulness. They reported less satisfaction with the level of understanding or acceptance found in the last dentist they had seen than with the dentist's level of technical competence and the diagnostic information they received. Dental phobics who had been to a dentist in the past year were generally more satisfied with their dentist than those who had not. It is suggested that a good dentist-patient relationship based on understanding and acceptance is an important factor in overcoming the avoidance of fearful patients.

voir, ils sont sans doute trop mal à leur aise ou ont trop peur pour dire ce qu'ils pensent. C'est pourquoi on a fait une étude des attitudes et des sentiments d'un groupe de phobiques dentaires dans le cadre d'une étude plus vaste sur l'efficacité des traitements psychologiques offerts aux patients dentaires souffrant d'anxiété excessive. On a recruté les sujets au moyen d'une annonce dans les journaux et on leur a demandé de remplir un questionnaire sur leurs expériences et leurs attitudes dentaires. Vingt-trois personnes ont fourni assez de données pour les fins de l'étude. Ensemble, elles offraient un bon éventail d'âges, de niveaux d'éducation, de niveaux de revenu et d'appréhensions en général. À leur avis, elles ont trouvé que le dernier dentiste visité avait moins pris soin de les comprendre et de les accepter qu'il ne s'était efforcé de se montrer compétent et de leur expliquer leurs problèmes dentaires. Celles qui avaient vu un dentiste dans la dernière année se disaient plus satisfaites que celles qui n'en avaient pas vu. On pense donc que de bons rapports entre dentiste et patient fondés sur la compréhension et l'ouverture à autrui constituent un important facteur pour aider les phobiques dentaires à surmonter leurs craintes.

Estimates of dental anxiety in the general population have varied between 5 per cent and 30 per cent over the years.¹⁻⁵ More recent studies suggest that the problem is more prevalent than had been thought earlier. Discrepancies in estimates may be due to different cut-off points used to indicate disproportionate levels of anxiety. However, there is wide agreement that one of the most devastating consequences of excessive dental anxiety is avoidance of necessary dental treatment. Such avoidance may result in the neglect of conditions that could eventually be costly to those individuals

and society at large. Furthermore, when dental phobics are driven to seek treatment by intolerable pain, the encounter is likely to be stressful to dentists and patients alike. Because avoidance is common in dentally anxious patients and many of those who do attend are too uncomfortable and frightened to communicate much of their attitudes, dentists are in a difficult position to know what these patients think and feel about their dental experiences. This report deals with the characteristics and dental experiences of a group of dentally phobic individuals who participated in a study designed to evaluate different types of behavioural treatments for the dentally anxious. It is presented in the hope that it will give dentists a better understanding of these individuals, leading to easier management and reduction of stress for all concerned.

Method

Participants were recruited by means of a newspaper advertisement. A short letter was sent to the "Have your Say" section of the *Toronto Sunday Star*⁶ to invite dentally anxious persons to participate in our study. The invitation was phrased in the following way: "Advances in dentistry mean that dental care involves only minor discomfort. Nevertheless, many people find dental treatment provokes such anxiety that a visit to the dentist becomes a nightmare or is avoided altogether. Fortunately psychologists have developed a number of techniques which can help these people to overcome their fear of dentistry and receive necessary dental treatment. Researchers at the University of Toronto are currently trying to discover the best way to provide this help. Any dentally anxious person who is interested in participating in this research should contact..."

Sample

More than 50 people responded during

SOMMAIRE

Des sondages faits dans le passé ont révélé que, dans le grand public, il y a un nombre considérable de personnes qui craignent le dentiste. Nombreux sont ceux qui, parmi eux, évitent le plus possible de lui rendre visite. Quant aux craintifs qui se résignent à aller le

the first two weeks following the publication of the newspaper letter. Each inquiry was dealt with at some length, usually over the telephone by the first author. As expected, not all of those who made contact were able or willing to commit themselves to the project. Candidates wishing to participate were asked to fill in a questionnaire regarding their previous dental experiences.

Questionnaire

The questionnaire was compiled to measure dental attitudes and behaviour, satisfaction with dentists' behaviour, and general fearfulness. Each part of the questionnaire included previously designed and tested instruments.

Dental attitude and behaviour.

The "Structured Interview for Assessing Dental Fear"⁷ was slightly amended to enable its use as a self-report instrument. It included questions relating to such aspects as how long since the individual had been to a dentist, whether there was avoidance due to fear, what specific things about going to a dentist were found to bother the individual, whether there was a felt need to see a dentist, and whether pain was experienced. Ratings on a 10-point scale (1=very uncomfortable, 10=very comfortable) were elicited for the following situations: telephoning for a dental appointment; having your teeth probed and otherwise examined by a dentist; having a dentist criticize the condition of your teeth; asking the dentist to be more careful because of pain you experienced during the last visit; an injection in your mouth before dental work; drilling of a tooth and filling a cavity; having a tooth pulled; being a patient in a dental chair and having a procedure demonstrated in your mouth in front of a crowd of dental personnel. They were also asked, "how confident are you that, at present, you could go to a dentist for an examination, cleaning and possible dental work?" (1=very unsure, 10=very sure).

The subjects level of dental anxiety was rated on the Corah Dental Anxiety Scale (DAS),^{8,9} a brief self-rating measure of dental anxiety which has shown very good psychometric properties. The scale asks about feelings concerning four situations relating to dentistry; namely, if you had to go to the dentist tomorrow, when waiting in dentist's office for turn in the chair, in chair waiting while dentist prepares drills, and in chair waiting to have teeth cleaned. Those situations are rated on a

five-point scale of feeling from 1 (relaxed) to 5 (extreme anxiety/fear).

Satisfaction with dentist behaviour.

Two measures were included to assess satisfaction: 1) "The Dental Visit Satisfaction Scale" (DVSS)¹⁰ was adapted from a medical interview satisfaction scale designed by Wolff, Putnam, James and Stiles¹¹ to assess satisfaction with the dentist in the context of a specific visit. 2) The "Dentist Behavior Items" questionnaire was designed from answers received from a group of adult hospital outpatients who had received dental treatment.¹² The patients were questioned about their nervousness and how the dentist and assistants contributed to it. Patients were also asked what they would do or say in the dentist's place to ease patients' nervousness. Their suggestions led to the compilation of a list of 25 dentist behaviour items.

Subjects were asked to complete both the Dental Visit Satisfaction Scale and the Behavior Items Questionnaire with reference to their *last* visit.

General fearfulness.

"The Fear Survey Schedule II"¹³ was included as a control for fearfulness, to determine if dental anxiety was specific or part of a more general problem. It consists of 51 items, each representing a common fear, i.e. closed places, spiders, speaking before a group. The items are rated on a seven-point scale, indicating the degree to which the subject experiences a given fear.

Results

Characteristics of subjects

Among those who returned the questionnaire, there were three men and 20 women and their ages ranged between 20 and 57 years with a mean of 39.04 years (SD=10.97). Ten people were married, nine were single, and four were separated or divorced. They ranged widely in educational level, one had obtained a Master's degree, four had Bachelor's degrees, 12 claimed some university credits or community college/trade school education, two more completed high school only, while four others had not. Their occupations ranged as widely as their education but will not be detailed here in order to preserve the anonymity of the respondents. Regarding the income of their household, there were six whose

income was less than \$20,000, eight had income between \$20,000 and \$50,000, and seven were in households with income levels over \$50,000. Two individuals did not specify their income level.

Dental attitude and behaviour Avoidance.

Only nine subjects had visited a dentist within the last year. Five subjects had not visited for periods of one to five years, another two subjects had not seen a dentist for as long as five to ten years, and seven had avoided dental visits for over ten years. Twenty-two out of the 23 respondents admitted to having avoided going to see a dentist, at some time, because of fear; 20 of them felt they needed treatment and 11 were actually experiencing some degree of pain. Regarding their confidence that they could go to a dentist, the mean of their ratings was 3.68 (SD=3.27) with^{1,0}(being most unsure) the mode or most common confidence rating given.

Dental anxiety.

The mean of scores on the Corah Dental Anxiety Scale (DAS) was 17.78 (SD=2.23) out of a maximum of 20. Following extensive experience with the DAS, Corah et al⁹ suggested tentatively that a score of 13 or 14 should alert dentists that they may be dealing with an anxious patient, and a score of 15 or more almost always indicates a highly anxious patient.

Mean scores on the eight situations depicted in the Structured Interview for Assessing Dental Anxiety are listed in the order of most to least uncomfortable: having a cavity drilled and filled (1.61), having a tooth pulled (1.70), having a dental procedure demonstrated (2.48), having teeth probed (2.52), having an injection in your mouth (3.13), having a dentist criticize (3.30), telephoning for a dental appointment (4.30) and, asking the dentist to be more careful (4.44). While there were individual variations on the ratings, the mode of the rating on all situations was 1, indicating extreme discomfort.

Subjects were given the opportunity to give answers to two open-ended questions. On the first of these, they were asked — what *specific* things bother you about going to the dentist? On the second, space was allocated for any other comments or impressions about their experiences with dentistry.

The answers from these two questions were found to contain recurrent and similar themes and, for this reason, were analyzed as a whole. The themes were readily identifiable as time of onset of phobia, specific aversive episode, and what was feared or found particularly aversive. It was usual for the respondents to qualify more than one aspect of their experiences. Twelve of the phobics dated the onset of their dental phobia to childhood and one during adulthood, 10 of them attributed it to a specific incident. Fifteen people mentioned their fear of pain, five specifically mentioned fear of "underfreezing", and three were afraid that the stress related to their worrying may be damaging to their health. Four feared receiving bad news about the state of their oral health and another four were uncomfortable with not knowing what to expect. Six individuals mentioned encountering a dentist with an unpleasant manner, four stated that they had been criticized overtly by their dentist, and three complained of receiving unnecessarily rough treatment at the hands of a dentist. Six mentioned their feeling of powerlessness and loss of control as being a deterrent and five mentioned their feelings of embarrassment regarding their own behaviour. Finally, money was mentioned only twice as being an aversive aspect of dentistry.

Satisfaction with dentist behaviour.

Three factors were abstracted from The Dental Visit Satisfaction Scale (DVSS) by its authors.¹⁰ These dimensions of satisfaction were identified as information-communication (I-C), understanding-acceptance (U-A), and perceived technical competence of the dentist (TC). Average scores on each of the dimensions were calculated for each subject and the means of the scores for each dimension were compared (I-C Mean-3.64 ; U-A Mean-3.06 ; TC Mean-3.63). Scores on understanding-acceptance were significantly lower than those on information-communication (t-2.96, d.f. 22, p < 0.01) and technical competence (t-3.32, d.f. 22, p < 0.01). However the difference between information-communication and technical competence scores was not significant (t=0.05, d.f. 22, n.s.).

The phobics in our sample varied greatly in endorsing positive behaviour items observed in the last dentist they had visited (Range 1-25). The mean of the group was 14.22 (SD=7.22).

TABLE 1
Behaviour items which were *not* endorsed by more than 50% of the dental phobics

Item #	%
22 told me that if it started to hurt, he would relieve pain	78.3
17 asked during the visit if I were concerned or nervous	73.9
18 gave me a step by step explanation of what he was doing as he did it	65.2
24 let me know that he'd do everything he could to prevent pain	60.9
8 encourage me to ask questions about my treatment	60.9
23 gave me moral support during the procedure	52.2
19 showed that he took seriously what I had to say	52.2
15 asked during the procedure if I were having any discomfort	52.2

The behaviour items which were not endorsed by more than 50% of the phobics are listed in order of their magnitude in Table 1.

General fearfulness

The mean anxiety score on the FSS-II was 131.09 (SD=49.33); the correlation between FSS-II and DAS scores (.0501) was not significant.

Those who had attended a dentist within the last year (n=9) versus the others (n=14)

Comparisons were made between these two groups, under the assumption that those who have attended recently were more likely to be less afraid, had less unpleasant experiences to report, and were more satisfied with their treatment than the others. In fact, the mean DAS scores of the attenders was lower (Mean-16.78; SD-2.05) than that of the avoiders (Mean-18.43; SD-2.17) but the difference fell short of significance (t-1.84, d.f. 21, p < 0.10). A MANOVA was carried out taking the three sub-scales of the DVSS by avoiders/attenders to show a significantly overall difference between the groups [F(3, 19)-4.86, p < 0.05]. All MANOVA tests were based on Pillais' criterion. Univariate analyses for I-C [F(1, 21) - 12.67, p<0.01], U-A [F(1, 21)-8.18, p < 0.01], and TC [F(1, 21)-11.40, p < 0.01] were all significant, indicating that the avoiders were less satisfied than the attenders. On the other hand, although the attenders obtained a higher mean score (Mean-16.33; SD-6.95) on the Dentist Behaviour Items Questionnaire than the avoiders (Mean-12.86;SD-7.32), the difference failed to reach significance (t=1.15, d.f. 21, n.s.). The only other difference between the two

groups was that the avoiders reported feeling embarrassed regarding their behaviour more often than the attenders (Fisher's Exact Probability Test - p < 0.05).

Discussion and Conclusions

There can be little doubt that the individuals who provided the information were dental phobics whose phobia had generalized to most aspects of dentistry. This appears to be the most important factor that characterized them. In other words, they were found to be distributed widely in terms of age, education and income levels. In addition, there was no relationship between their dental anxiety and general fearfulness. Women were very much over represented but this has been found to be the case in other studies of fears and phobias.¹⁴ As a group, they were least satisfied about the understanding-acceptance aspect of their relationship with the last dentist they visited. While fear of pain was mentioned by a majority of the phobics, they appeared to have received little reassurance from their dentist regarding pain relief or were not asked if they felt any discomfort. The answers we received appeared to reflect many unmet expectations. It also seemed that many of the dentists in question chose to ignore their patients' concern and nervousness. This may be a considered strategy based on the belief that if you do not acknowledge fear and nervousness in a patient, it will go away. From our data, it is the patient who goes away, not the fear. Patients revealed concern about not knowing what to expect from their dental visits and feeling powerless. At the same time, more than half of our sample reported that they were not given step by step explanations of what was being done nor were they encouraged to ask questions. Lastly, a

substantial proportion, did not feel that they received moral support from their dentist or were taken seriously.

It should be of interest to dentists that those who showed more satisfaction with their last dental visit were also those who had attended in the last year, making it clear that good dentist-patient relationships do pay off and may go a long way in reversing the effect of earlier traumatic experiences. It should not be lost sight of that one of the greatest differences between those who had attended recently and those who had not, was that the avoiders were more often embarrassed by their behaviour; and therefore, are likely to need extra understanding and acceptance before they return for regular treatment. In conclusion, this study does not purport to give an accurate picture of the potential number of phobics in the general population, only that a limited advertisement produced this number of inquiries. We are not certain why fewer patients completed the questionnaire than inquired about the program. It could be lack of confidence in our methods or lack of confidence in their ability to benefit. Some patients have voiced their preference for methods which do not involve their participation, such as general anesthesia. Some patients said they were coming forward at this time because, in the past, they had used financial considerations as excuses but that, since they or their partner were in a dental plan, they felt pressure to do something about their phobia. Therefore, our response rate could be "the tip of a very large iceberg". Finally and encouragingly, there is evidence to support the position that a good dentist-patient relationship can play an important part in overcoming avoidance of dental treatment. △

Dr. Liddell is Professor in the Department of Psychology of Memorial University of Newfoundland. This study was carried out while she was on sabbatical leave in the Faculty of Dentistry, University of Toronto.

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Signes buccaux des maladies dermatologiques

Judy Zucker*
Christiane Mascrès**
Robert Charland***

ABSTRACT

*There exists a multitude of systemic diseases which exhibit consequential oral manifestations. Dermatologic disorders frequently involve intraoral and perioral tissues which dental practitioners should be familiar with. A compilation of disorders including; **bullous diseases** (such as Pemphigus Vulgaris, Erythema Multiforme, Pemphigoid, Dermatitis Herpetiformis, Epidermolysis Bullosa, and Darier's disease), as well as **non bullous diseases** (such as Lichen Planus, Psoriasis, Lupus erythematosus, Scleroderma, and Perioral Dermatitis); and their oral manifestations are presented in order to facilitate their early diagnosis and subsequent treatment.*

RÉSUMÉ

Parmi les nombreuses maladies systémiques présentant des signes buccaux et péri-buccaux, les maladies dermatologiques occupent une place de choix. Capables d'aider à établir un diagnostic précoce, le médecin-dentiste devrait être familier avec les signes cliniques et buccaux d'un certain nombre de maladies bulleuses (comme le pemphigus vulgaire, l'érythème multiforme, le pemphigoïde, la dermatite herpétiforme et l'épidermolyse bulleuse), ainsi que de maladies non bulleuses (comme le lichen plan, le psoriasis, le lupus érythémateux, la sclérodermie et la dermatite péri-orale).

Les signes cliniques et buccaux sont présentés pour chacune des

maladies dermatologiques précitées, afin de faciliter leur diagnostic précoce par le praticien.

Pour le médecin-dentiste considéré comme compétent un patient est beaucoup plus qu'une double rangée de dents. Au contraire, l'examen dentaire est généralement la dernière étape d'évaluation d'un examen complet de la tête et du cou. Les tissus buccaux et péri-buccaux donnent au dentiste averti une multitude de signaux concernant l'état général du patient avant même qu'un praticien général n'ait la possibilité d'être alarmé par son état de santé, et avant même aussi que l'intéressé(e) ne soit conscient(e) qu'il ou elle souffre d'une quelconque anomalie.

Parmi les maladies générales ou systémiques dont la prévalence est actuellement élevée, les maladies dermatologiques rentrent dans la catégorie de ces maladies où une observation détaillée de la cavité buccale peut permettre la détection précoce de signes pathognomoniques conduisant à un diagnostic dermatologique précoce. Par exemple, on trouve invariablement une anodontie ou une oligodontie au cours de la dysplasie ectodermique héréditaire. Des lésions intra-orales blanches, en pain à cacheter ou en feuilles de fougère font suspecter le lichen plan. Le signe de Nikolsky où l'épithélium se clive du conjonctif sous jacent au contact d'une pression est clairement évident dans le pemphigus vulgaire, pour n'en nommer que quelques-uns.

Cet article veut mettre un accent particulier sur l'intervention que peut faire le dentiste pour établir le diagnostic précoce de certaines maladies dermatologiques dont nous présenterons certains prototypes parmi les maladies bulleuses et non bulleuses.

LES MALADIES BULLEUSES

Les maladies dermatologiques à bulles abordées dans cette section et qui s'accompagnent de signes buccaux sont les suivantes: le pemphigus vulgaire, le pemphigoïde, la dermatite herpétiforme,

l'érythème multiforme et l'épidermolyse bulleuse.

Le pemphigus

C'est une maladie de peau, sérieuse et chronique. D'étiologie inconnue, on pense qu'elle implique un mécanisme auto-immun avec la présence d'anticorps circulants spécifiques.¹ On subdivise le pemphigus en quatre catégories: vulgaire, végétant, foliacé et érythémateux. Toutes s'accompagnent de vésicules et de bulles, et toutes impliquent la cavité buccale. Cependant, le pemphigus vulgaire est la forme la plus grave et celle où l'atteinte buccale est la plus spectaculaire.

L'homme et la femme peuvent être atteints également. Si quelques histoires de cas sont présentées chez l'enfant, on décrit rarement le pemphigus vulgaire avant l'âge de 30 ans. Les juifs Ashkenazi sont la clientèle de choix.

Bien que la cavité buccale soit souvent le premier lieu d'apparition des lésions, le tronc est généralement d'abord impliqué. Les vésicules et les bulles se développent par cycles. Leur diamètre va de quelques millimètres à quelques centimètres. Elles contiennent un liquide clair et transparent qui devient purulent et sanguinolent. Elles se déchirent en laissant une surface érodée. Lorsqu'on frotte une surface cutanée apparemment saine, l'épithélium se détache des couches profondes, car l'oedème clive la jonction dermo-épidermique. C'est le signe de Nikolsky.^{2,3}

D'après certaines études, les lésions buccales peuvent précéder de sept mois l'apparition cutanée.³ Cinquante pour cent des patients avec pemphigus vulgaire se signalent par une atteinte buccale. Les lésions sont identiques à celles décrites au niveau cutané, mais les bulles se déchirent dès que formées, laissant une ulcération effilochée couverte d'un exsudat blanchâtre. Ces lésions dégagent une odeur fétide. A cause de la douleur, tolérable ou sévère, les patients vont présenter une hypersalivation réflexe.^{2,3}

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Le dénominateur commun étant l'auto-immunité, on a voulu établir une relation de cause à effet entre pemphigus vulgaire et cancer buccal. Il devrait plutôt s'agir de deux entités différentes dont l'installation simultanée serait simplement une coïncidence.⁴

Le traitement systémique exige des corticostéroïdes et des antibiotiques dans le cas d'infection secondaire. Localement, des bains de bouche adoucissants et des topiques anesthésiants améliorent l'inconfort et la douleur.^{2,3}

Le pemphigoïde bénin

(ou cicatriciel, ou oculaire)

D'étiologie aussi inconnue, on lui soupçonne aussi une origine auto-immune. La femme entre 40 et 50 ans² est deux fois plus souvent atteinte que l'homme.³ Des lésions vésiculo-bulleuses apparaissent autour des organes génitaux et des quatre orifices, anal, narinaires et buccal. L'oeil est sérieusement atteint avec une conjonctivite, une opacité de la cornée avec la formation d'adhérences pouvant conduire à la cécité.

Des lésions s'observent au niveau du buccopharynx, du larynx et de l'oesophage. Elles s'observent au niveau de la gencive d'une façon constante, épaissies et qui ne s'ulcèrent qu'après 24 à 48 heures, en laissant une surface à vif qui guérit avec difficulté donnant le tableau clinique d'une gingivite chronique.^{2,3}

Le traitement à base de corticostéroïdes systémiques et topiques est préconisé ainsi que des immunosuppresseurs dans les cas sévères.³

La dermatite herpétique

(Maladie de Durhing-Brocq)

C'est une maladie chronique rare et récidivante (elle peut durer dix ans), d'origine inconnue, bien qu'elle soit souvent associée avec une malabsorption intestinale. Malgré son nom, elle est complètement indépendante du virus herpétique. Ses récives peuvent être précipitées par un stress émotionnel ou une infection aiguë. Les patients atteints sont deux fois plus souvent des hommes que des femmes, de 20 à 55 ans. Mais on signale des cas chez la clientèle infantile. Après un prurit prémonitoire, des bouquets de vésicules symétriques, de papules, de pustules, de bulles s'installent un peu partout avec une exacerbation durant l'été. Les lésions intra-buccales s'ulcèrent très rapidement.

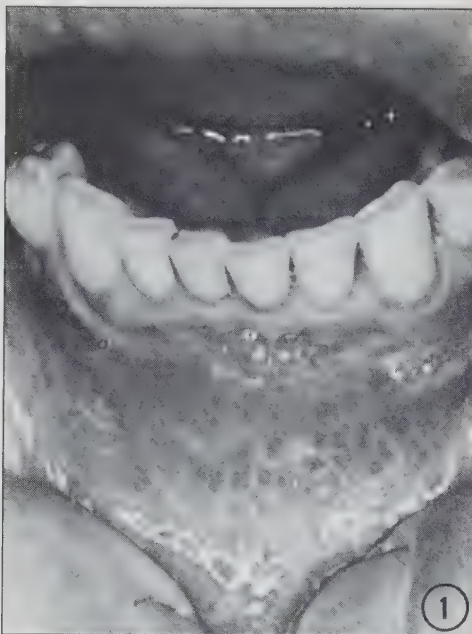


Fig. 1. Le lichen-plan de la lèvre inférieure donne une image arborescente en feuilles de fougères.

La maladie ne répondant pas aux corticostéroïdes, le traitement de choix est la sulfapyridine.^{2,3}

L'érythème multiforme

Cette dermatite aiguë d'origine inconnue est sans relation avec une immunodéficience, mais dans 50 pour cent des cas elle est précipitée par une infection virale, bactérienne ou fongique ou par la prise de médicaments. Les jeunes adultes mâles sont particulièrement susceptibles. Des maculo-papules ou des vésicules, des bulles, se distribuent au niveau des mains et des bras, des pieds et des jambes, du visage et du cou. Ces lésions en bague sont pathognomoniques de la maladie. On les décrit comme "en cible", ou "en cocarde", ou "en oeil de taureau". Dans la cavité buccale, elles sont moins précisément définies, s'ulcèrent vite, sont douloureuses et peuvent parfois précéder les lésions cutanées.

La forme la plus sévère prend le nom de "syndrome de Steven-Johnson" et inclut les organes génitaux et les yeux. Les lésions péri-buccales et endobuccales sont aussi très sévères, et le patient développe alors des signes généraux et de la photophobie.

L'érythème multiforme se traite avec des corticostéroïdes par voie générale.²

L'épidermolyse bulleuse

C'est encore une fois une maladie rare mais elle est héréditaire. Classifiée en trois², ou cinq catégories³ selon les auteurs elle se caractérise par l'appari-

tion spontanée ou après un traumatisme minime, de vésicules et de bulles cutanées et muqueuses.

Différentes parties du corps sont préférentiellement atteintes selon les différents types d'épidermolyse bulleuse mais les pieds et les mains sont très souvent affectés²⁻⁵.

Des bulles au niveau de la cavité buccale sont le plus habituellement observées dans la forme récessive. Elles sont douloureuses, précédées par une tache blanche et peuvent être initiées par une simple intervention dentaire de routine. Des lésions dentaires, comme des dents avec microdontie, ou des agénésies et des hypoplasies sont aussi rencontrées, particulièrement dans cette forme³.

La maladie répond aux corticostéroïdes.

LES MALADIES NON BULLEUSES

Dans cette catégorie, viennent se regrouper le lichen plan, le psoriasis, le lupus érythémateux, la sclérodermie, la dermatite péri-buccale, et la maladie de Darier bien qu'il en existe une forme bulleuse⁶.

Le lichen plan

Maladie assez répandue et d'origine inconnue, ses signes buccaux précèdent les lésions cutanées et son diagnostic devrait s'établir sans biopsie³ bien que de nombreuses descriptions incluant la présence de bulles, puissent compliquer le tableau clinique classique composé de formes réticulaire, atrophique ou érosive.² L'apparition peut être soudaine ou progressive. Les lésions cutanées apparaissent occasionnellement comme des vésicules ou des bulles, mais le plus souvent comme des papules de quelques millimètres, plates, confluentes et qui desquament finement. D'abord rouges, elles peuvent violacer puis brunir. Les stries de Wickham en forme de feuilles de fougère ou de pains à cacheter, adoptant des configurations annulaires ou linéaires sont un signe pathognomonique endobuccal bien connu du dentiste.³ (Fig. 1). Les lésions cutanées ou muqueuses peuvent être seules présentes. On peut aussi observer une association des deux.

L'incidence du lichen plan varie de 0.1 à 1.2 pour cent d'après l'origine ethnique des études. Toutes les races et tous les sexes peuvent être également atteints, mais le groupe d'âge le plus souvent affecté se situe entre 30 et 60 ans. Silverman, cependant, compte 67 pour cent de femmes d'un âge moyen de 52 ans, parmi 570 patients.⁷

Trois théories étiopathogéniques ont été avancées. On suspecte d'abord une origine virale, considérant les analyses au microscope électronique. On a mis de plus en évidence le rôle des stress psychologiques, certainement facteurs précipitants ou déclenchants. Enfin, l'éclosion des lésions peut se faire en rapport avec la manipulation de drogues, de métaux lourds et de produits chimiques utilisés dans l'industrie photographique. La personne atteinte de lichen plan devrait aussi présenter une prédisposition génétique pour que cette maladie puisse s'installer.² Le lichen plan s'accompagne de réactions immunologiques secondaires ayant pour base une défaillance du système immunitaire. Ainsi des patients atteints de lichen plan et sensibilisés au mercure de leurs obturations d'amalgame, ont bénéficié d'une guérison de leur lichen plan après la suppression de leurs obturations d'amalgame.¹

On a décrit une association du lichen plan avec de nombreuses maladies systémiques incluant le diabète, l'hypertension, la colite ulcéreuse, le lupus érythémateux, etc... Cependant, bien que les patients atteints de certaines maladies digestives soient plus susceptibles au lichen plan, une étude portant sur un groupe de 130 patients n'a montré aucune corrélation entre lichen plan et dysfonctionnement hépatique.⁸ La lésion du lichen plan se présente sous forme d'une papule constituée au microscope d'un infiltrat lymphohistiocytaire épais surmonté de cellules épithéliales hyperkératosiques.

Les formes non érosives peuvent être ignorées du patient car elles sont asymptomatiques. Bien que longtemps considérée d'ailleurs comme une lésion bénigne,² on attribue actuellement au lichen plan un potentiel malin. En effet, le lichen plan pourrait être un facteur prédisposant aux épithélioma de la cavité buccale. Silverman a observé une transformation maligne chez 1.2 pour cent de sa série de patients, 3.4 ans en moyenne après le diagnostic de la maladie.⁷ Le lichen plan érosif serait la forme clinique la plus susceptible de dégénérer.⁹ Il est bon de discuter du traitement avec le patient puisque la cure comporte essentiellement une décharge du stress émotionnel. En cas de douleur, des topiques stéroïdiens ou des adoucissants devraient conduire à l'amélioration des symptômes.



Fig. 2. Le psoriasis peut s'accompagner de discolorations unguéales et d'onicholyse.

Le psoriasis

Il se caractérise par une accélération du renouvellement épithélial qui passe de 28 jours à trois ou quatre jours. La maladie se caractérise cliniquement par une hyperplasie sous forme de papules et de plaques érythémateuses accompagnées de squames blanches.¹⁰ Un à deux pour cent de la population américaine est affecté, aussi bien les hommes que les femmes, entre 20 et 40 ans. Mais son incidence peut être parfois particulièrement basse, comme chez les Japonais.² Bien qu'officiellement son étiologie demeure inconnue, le psoriasis a probablement une origine polygénique et multifactorielle. Une relation entre le psoriasis et l'antigène HLA a été aussi mise en évidence.²⁻¹⁰

Les facteurs environnementaux sont d'extrême importance pour expliquer la prédisposition au psoriasis. Parmi ceux-ci les traumatismes sont souvent à l'origine du phénomène isomorpique de Koebner au cours duquel peut s'observer une flambée spectaculaire des lésions. Le stress émotionnel a aussi une influence provocatrice, dans l'installation des premiers signes et le déclenchement des crises.² Les sites cutanés de prédilection sont les coudes et les genoux, le scalp et la peau de la région lombo-sacrée. Le psoriasis peut s'associer avec de l'arthrite, surtout au niveau des doigts et dans 30 pour cent des cas les ongles sont impliqués avec un jaunissement, des lésions en puits et une onicholyse² (Fig.2).

Les changements muqueux sont difficiles à détecter bien que le gland pénien puisse être impliqué d'une

manière habituelle.² Les lésions buccales sont rares et même parfois discutées. De 3.5 à 11 pour cent des patients peuvent présenter une chéilite angulaire, de 1 à 5 pour cent une langue géographique. Une étude récente a montré des lésions géographiques au palais et sur la muqueuse buccale de 19 patients sur 100 avec psoriasis. Un certain nombre de gingivites ou de gingivostomatites desquamatives lui sont aussi imputées.¹⁰

Les patients avec psoriasis compliqué d'arthrite peuvent présenter deux fois plus souvent que ceux atteints de psoriasis simple, des douleurs au niveau de l'articulation temporomaxillaire. Les symptômes subjectifs corrént avec un mauvais état général, du stress, des lésions cutanées prurigineuses, des interférences occlusales et une mastication incorrecte.^{11,12} Enfin, du bruxisme diurne et nocturne, a été observé chez 40 pour cent d'un groupe de 1450 psoriatiques étudiés.¹³

Le traitement est difficile et les récives sont imprévisibles. Des corticoïdes en topique et des expositions aux rayons ultra-violets améliorent les signes cliniques qui peuvent disparaître spontanément.²

LE LUPUS ERYTHEMATEUX

Il se présente sous deux formes: discoïde, la forme la plus habituelle, et systémique, la forme plus grave. Ces deux formes pourraient être considérées comme des variantes de la même maladie mais ceci est souvent contesté.¹⁴ Le lupus érythémateux systémique atteint 4.1¹⁴ à neuf femmes¹⁵ pour un homme, et la race noire trois fois plus souvent que les caucasiens. La maladie se déclare à n'importe quel âge, mais on observe une prévalence entre 20 et 40 ans.¹⁵ Par contre, les porteurs à la naissance du lupus érythémateux discoïde sont des mâles avec un ratio de 1.2, 1.4 et 2.6 selon les génotypes.¹⁴ Bien que les facteurs de l'environnement comme les drogues, les infections virales ou bactériennes aient une grande influence sur le développement de la maladie, les formes systémiques et discoïdes sont d'origine génétique et génétiquement distinctes. On compte, par exemple, trois génotypes pour le lupus érythémateux discoïde suivant l'âge où les signes cliniques apparaissent. Le lupus érythémateux systémique implique, lui, trois allèles dominants liés au sexe. Sa sévérité est, de plus, en relation avec l'antigène, HLA B8. Des



Fig. 3. La dermatite péri-buccale d'allure papuleuse pourrait être confondue avec un eczéma.

allèles autosomiques prédisposants sont aussi présents dans tous les génotypes des deux formes.¹⁴ De nombreux critères permettent le diagnostic du lupus érythémateux systémique. Il s'accompagne d'un lupus discoïde avec un exanthème nasal en aile de papillon, comme un "loup" vénitien. La patiente se plaint de photosensibilité et d'arthrite. Plèvre et péricarde peuvent être enflammés. On signale des lésions endothéliales des valvules cardiaques dans 50 pour cent des cas. Une endocardite bactérienne peut se surajouter chez 1 à 4 pour cent de ces patients. Les reins sont souvent atteints et le patient présente une protéinurie anormale. Une atteinte neurologique (avec épilepsie ou psychose) et hématologique (avec anémie hémolytique, neutropénie ou thrombocytopenie) s'observe parfois. Cependant le lupus érythémateux doit être considéré essentiellement comme une maladie immunologique. En effet, on enregistre par exemple la présence d'anticorps antinucléaires incluant des anti-ADN, et celle de cellules LE pathognomoniques dans le sérum des patients atteints.¹⁵

Les lésions buccales s'observent chez 3 pour cent des patients environ avec un lupus discoïde. Les lèvres sont souvent impliquées, rouges, rugueuses et épaissies, ulcérées et croûteuses. Des taches érythémateuses superficiellement ulcérées s'installent sur les joues, la langue et le palais. Les lésions impliquent les muqueuses dans 26 pour cent

des cas. Elles siègent surtout au palais (dans 82 pour cent des cas), et sur les gencives et la muqueuse buccale. Des ulcères buccaux et des maux de gorge à répétition entraînent des dysphagies. Des ulcères de la muqueuse du septum nasal aggravent le tableau clinique dans 5 pour cent des cas. Des érythèmes et des ulcères de la région périanale et de la vulve peuvent se développer en même temps que les ulcérations buccales.¹⁴ La gingivite ulcéreuse nécrosante aiguë observée dans le cas de lupus érythémateux sévère conduit à la perte des dents sans qu'un traitement local puisse s'avérer vraiment efficace.¹⁶ Enfin, ces patients présentent souvent des surinfections par *Candida* ainsi que de l'*herpes zoster*.¹⁴

L'irradiation était souvent le traitement de choix du lupus, ce qui augmentait la prévalence des épithélioma spino-cellulaires chez les patients ainsi traités.¹⁷ Ce traitement est maintenant désuet. On préconise une antibiothérapie prophylactique pour protéger l'endothélium des valvules cardiaques d'une bactériémie, en cas d'intervention dentaire.¹⁵ Une thérapie systémique incluant des corticostéroïdes est préconisée chez les patients qui ne répondent pas aux salicylates et à l'indométhacine.¹⁶ Ces traitements chroniques associés à une chute de la résistance du système immunitaire rend ces sujets très susceptibles à l'infection, ce qui rend plus impérative la prescription d'une antibiothérapie pour couvrir toute intervention.^{14,15}

La sclérodermie

(sclérose systémique progressive)

Encore une fois classifiée comme une maladie du "collagène" tout comme le lupus érythémateux, la sclérodermie est plus précisément une maladie auto-immune qui met en évidence des anticorps anti-ADN et qui peut impliquer le système conjonctif au complet incluant la peau et les organes profonds.¹⁸ La sclérodermie se classe en formes circonscrites ou systémiques selon l'importance des signes cliniques observés. Cependant, l'éventail des possibilités de rencontrer des expressions cliniques différentes est particulièrement riche.¹⁸ Dans le syndrome "Crest", par exemple, alors même que l'atteinte dermatologique est discrètement limitée aux doigts et au visage, on observe une calcinose cutanée avec télangiectasies, une sclérodactylie avec un phénomène de Raynaud, et une dysfonction oesophagienne. Dans ce cas aussi, les viscères sont impliqués avec le temps.¹⁸ Les femmes entre 30 et 50 ans sont deux fois plus souvent atteintes que les hommes.³

La maladie se caractérise cliniquement par une insuffisance vasculaire des artérioles ainsi qu'une fibrose progressive du mésenchyme. Le début est surtout cutané: un érythème oedémateux au visage, aux mains et au tronc qui évolue à toute la surface cutanée tout en s'associant à des névralgies et des signes d'arthrite.³

La cavité buccale n'est pas épargnée. Alors que se développe une rigidité faciale cutanée à l'allure de masque, les lèvres s'amincissent et les joues perdent leur plasticité. La diminution de la taille de l'ouverture buccale peut affecter la parole, ainsi que l'induration observée au niveau de la langue et du palais mou.¹⁹ Le ligament parodontal s'épaissit de 2 à 4 fois, ce qui est un signe pathognomonique de la maladie.³ Des déséquilibres occlusaux s'installent en provoquant des interférences douloureuses.¹⁴ Une arthrite rhumatoïde implique les condyles dans 50 pour cent des cas. La mandibule présente aussi des lacunes d'ostéolyse au niveau de l'angle.²⁰

L'étiologie de la sclérodermie est encore inconnue et on ne lui connaît pas de traitement efficace, bien que la cortisone puisse accorder des rémissions partielles.³ Compte-tenu des difficultés d'hygiène, la brosse à dents électrique et des bains de bouche anti-bactériens sont à préconiser.¹⁹

LA DERMATITE PERIBUCCALE

Exclusivement localisée autour de la bouche, cette dermatite a une étiopathogénie qui n'est pas encore parfaitement résolue. Il ne fait aucun doute qu'elle succède parfois à l'emploi topique prolongé de corticostéroïdes. On a aussi soupçonné la pilule contraceptive, les dentifrices fluorés, des produits de beauté et un stress émotionnel. Un traitement systémique à base de corticoïdes peut aussi s'accompagner d'une dermatite péri-buccale. Les jeunes femmes (avec une moyenne d'âge de 28 à 30 ans) sont spécialement atteintes. Elle se caractérise par une éruption érythémateuse persistante qui a une allure d'eczéma et se compose de minuscules papules parfois pustuleuses (Fig.3). Les plaques peuvent s'étendre aux ailes du nez, à la glabelle et aux paupières. Le *candida* peut surinfecter les lésions qui sont aussi extrêmement sensibles aux conditions atmosphériques et aux irritations de l'environnement.

La dermatite péri-buccale répond bien au traitement. Celui-ci consiste d'abord à supprimer les corticoïdes et la cause reconnue. De l'oxytétracycline est ordonnée par voie buccale. L'emploi d'érythromycine ou de tétracycline en topique est une bonne alternative chez la femme enceinte.¹⁴

La maladie de Darier

La maladie de Darier est une dyskératose bénigne héréditaire, une "généodermatose" qui se transmet comme un caractère dominant parfois lié au sexe et qui parfois apparaît comme une mutation.³⁻⁶ Une insuffisance en vitamine A pourrait aussi influencer les lésions.³ L'atteinte apparaît l'été, au cours de l'enfance et de l'adolescence, et s'observe, selon les auteurs, plus fréquemment chez le garçon,⁶ ou également répartie entre les deux sexes.³ Des lésions cutanées permanentes apparaissent sur le front, le cuir chevelu, les plis nasogéniens, les épaules, les plis corporels et toutes les zones où la peau est séborrhéique. Des petites papules apparaissent, virant du rouge au brun et au pourpre, puis s'ulcèrent et deviennent croûteuses. Une kératose palmo-plantaire peut gêner la fonction.³ Les ongles sont striés et fissurés.³⁻⁶

Les signes buccaux sont fréquents puisqu'ils s'observent dans 50 pour cent des cas. Les lésions siègent surtout sur l'ensemble du palais mais aussi

à la langue, sur la muqueuse buccale, la gencive, le pharynx, sous forme de papules jaunâtres ombiliquées.^{2,3}

Bien qu'il existe une forme avec bulles dyskératosiques, les formes histologiques habituelles sont caractérisées par des "grains" dyskératosiques, englobés dans des masses cornées.⁶

Le traitement est à base de vitamine A,⁶ ou de corticoïdes.³ Une dégénérescence maligne des lésions n'a jamais été décrite.

Il est impossible dans un article de cette longueur de passer en revue l'ensemble des maladies dermatologiques et de leurs manifestations buccales. Nous nous sommes attachés cependant à présenter certaines maladies significatives rencontrées dans un échantillon moyen de population.

Étant donné l'incidence des maladies de peau parmi la population nord-américaine (par exemple 6 pour cent souffrent du psoriasis,¹³ 2 pour cent du lichen-plan,¹³ 1.3 à 5 pour cent du lupus érythémateux,¹⁷ etc...) et qu'on peut observer d'une façon presque systématique des corrélations entre les signes cutanés et les signes buccaux, la connaissance de ces maladies devrait être intégrée à la formation de base du médecin-dentiste généraliste.

Bien que le traitement systémique, le plus souvent à base de corticoïdes, soit administré par le dermatologiste, il semble indispensable que le dentiste lui-même soit correctement préparé à soulager les symptômes buccaux et à améliorer le confort et la qualité de vie de son patient. La plupart des symptômes sont en effet rendus plus tolérables par l'application de topiques stéroïdiens ou anesthésiants, et par des bains de bouche adoucissants. Reconnaître les signes buccaux de ces maladies dermatologiques représente un atout qui peut aider le dentiste à répondre encore mieux aux besoins de sa clientèle. △

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Optimal placement of osseointegrated implants

Murray L. Arlin, DDS, FRCD(C)
Toronto, Ontario

INTRODUCTION

The recent introduction of the osseointegrated technique for dental implants has been a major advance in clinical dentistry.¹ With this modality in particular, meticulous attention to the proper diagnosis, treatment plan, and treatment itself is critical for long-term success. When dental implant patients are treated by the "team approach" (i.e., surgical specialist and restorative dentist), there must also be excellent communication and coordination on the "team" in order to achieve optimal results (Tables I and II). Interested readers are referred to an article by this author on the subject of diagnosis, radiographs, and treatment planning of implant patients.² The present article will discuss and illustrate how to achieve optimum placement of osseointegrated implants with the aid of various types of "surgical" and "radiographic correction" acrylic intraoral stents.

AVANT-PROPOS

En implant dentaire, l'osséointégration est une technique relativement récente qui a fait faire un grand pas à la dentisterie clinique¹. Pour assurer à long terme le succès des implants osséointégrés, une méticuleuse attention doit être apportée au diagnostic, au plan de traitement et au traitement. Lorsque le patient ayant besoin d'un implant est traité par une équipe (i.e. un chirurgien dentaire et un spécialiste en restauration), la communication entre les membres et la coordination de leur travail doivent être excellentes afin d'obtenir les meilleurs résultats possible (tableaux I et II). Les lecteurs intéressés sont invités à consulter un article de l'auteur portant sur le diagnostic, les radiographies et le plan de traitement pour les patients ayant besoin d'implants². Quant à cet article-ci, il explique et illustre comment placer le mieux possible les implants osséointégrés à l'aide de divers dispositifs de

"rétenction chirurgicale" et de "correction radiographique" en matière acrylique.

The optimal placement of osseointegrated dental implants is extremely important in order that the final restorative result satisfies the patient's need for comfort, function, esthetics and ease of maintenance. This is particularly important with crown and bridge-implant supported applications in the partially edentulous patient. During the initial surgical phase, it is often difficult for the surgical specialist to accurately identify the ideal implant positions (i.e. in all three dimensions relative to other implants and/or the natural dentition) without the aid of a "surgical stent" or guide. The restorative dentist and surgical specialist must cooperate to design and prepare the stent pre-operatively.

Stent Fabrication Technique

A wax trial set-up is made on study models that have been mounted on an appropriate articulator. After the patient has approved the try-in, an impression of the wax-up is made and poured in stone. The stone cast is now utilized to fabricate an omnivac acrylic matrix. It

is advisable to fabricate a prosthetic matrix (0.020 inch thickness) and a surgical matrix (0.060 inch thickness). A silicone or plaster index can then also be taken of the wax-up, to be used later as a guide to tooth placement for the final prosthesis. Next, the wax-up is removed from the original model and the omnivac acrylic matrix is positioned on the case. Although the matrix can be utilized in this form as a surgical stent, in the opinion of this author, this may provide an inaccurate guide (Fig. 1) and it is better to fill in the dentulous areas of the matrix with (clear) cold-cure acrylic. Once the acrylic sets, the restorative dentist should accurately locate and angle a 2 mm. diameter drill hole into the acrylic in the anticipated ideal implant locations. The drill should penetrate the acrylic and lightly score the model. The end result is a tunnel-like preparation in the acrylic, into which an appropriately sized drill or paralleling tool can be securely inserted to indicate the desired position (in all 3 dimensions) of the future implant (Figs. 7-10).

In cases where the implant location is less critical, the stent can be modified with bar-overdenture or overdenture application. The stent should be fabri-

TABLE 1

Pre-surgical responsibilities

Restorative Dentist	Surgical Specialist
— prosthetic evaluation — prosthetic treatment plan — surgical, prosthetic and radiographic correction stents	— medical and dental evaluation — radiographs — implant type, number, and position

TABLE 2

Post-surgical responsibilities

Restorative Dentist	Surgical Specialist
— interim prosthetic alterations — final prosthetic fabrication — maintenance	— soft tissue evaluation — hard tissue evaluation — radiographic evaluation — maintenance

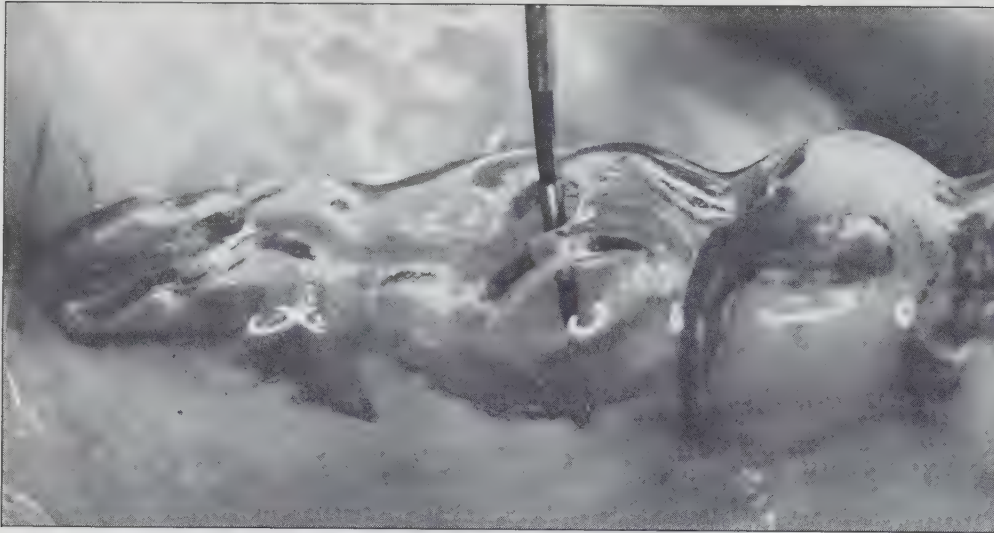


Fig. 1 — An omnivac acrylic matrix (or stent) demonstrating a periodontal probe inserted through the central fossa area. Although the holes in the acrylic can be placed in the ideal position, this type of stent does not prevent inadvertent probe angulation. When transferring from the occlusal aspect of the clinical ridge, significant inaccuracies may occur.

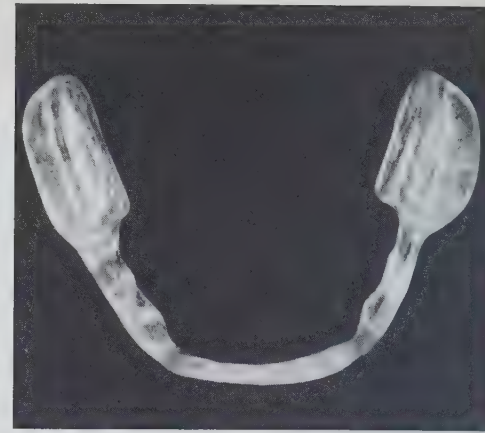


Fig. 2 — Occlusal view of a surgical stent designed for the completely edentulous mandible where implant placement is anticipated mesial to the molar areas. Note the coverage of the retromolar pad areas for stability. Also note the labial aspect of the stent, which represents the idealized final prosthetic tooth positions. The labial aspect will act as a guide for the implant site selection.

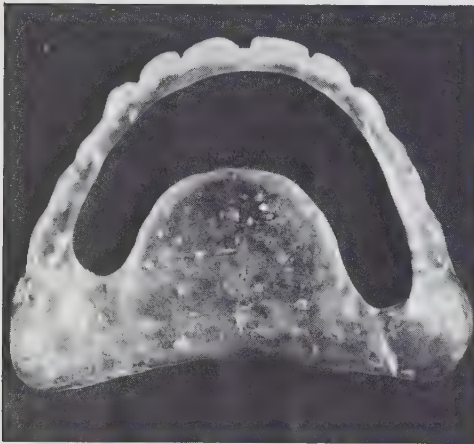


Fig. 3 — Occlusal view of a surgical stent designed for the completely edentulous maxilla where implant placement is anticipated mesial to the molar areas. Note the coverage of the tuberosity and posterior palatal areas for stability. Also note the labial aspect of the stent which represents the idealized final prosthetic tooth positions. The labial aspect will act as a guide for the implant site selections.

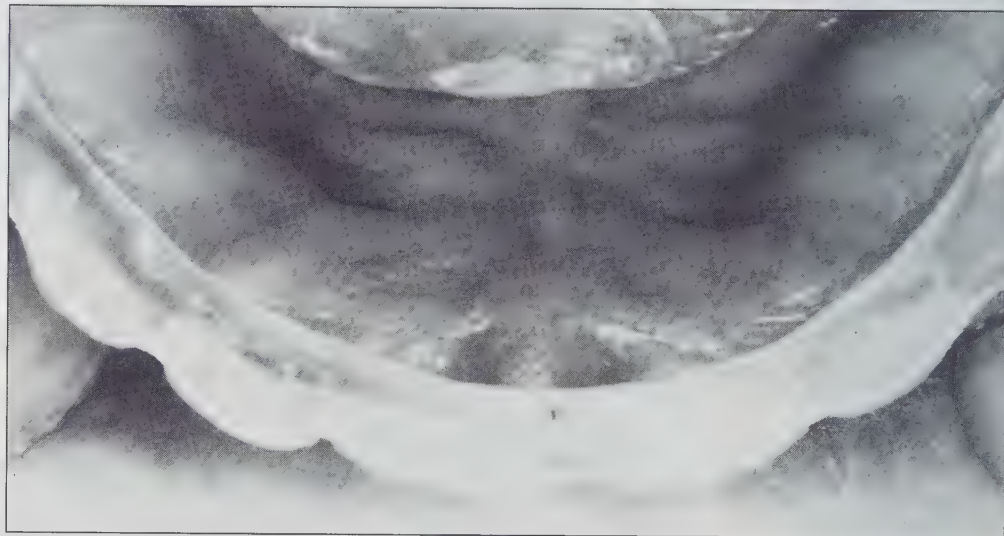


Fig. 4 — Occlusal view of the surgical stent seen in Fig. 3. Note the generous portion of acrylic that has been removed between the palatal acrylic and labial aspect of the stent. This design allows for unobstructed access to the surgical area when a flap is raised from the palatal aspect out to the labial.

cated so that it seats securely in the mouth after the flaps have been raised. This can be accomplished by having intimate and generous tissue contact on the retromolar pads (**Fig. 2**) or tuberosity and post-palatal seal areas (**Fig. 3**). In all situations, a generous area of the stent must be cut out in the anticipated areas where the implants are to be placed (**Figs. 2,3,4**). Additionally the stent should provide an indication of where the prosthetic teeth will be placed. This can be accomplished by incorporating the vestibular portions of the "teeth" part of the stent (**Figs. 2,3,4**).

The ideal implant position, from a restorative point of view, will usually be parallel to the adjacent implants and adjacent tooth roots, as well as directed toward the occlusal centre of the tooth, i.e. the cingulum for anteriors and central fossa for posteriors. Where possible, this should also correspond to the contact point of the opposing tooth. The placement must also take into account the amount of restorative material that will surround the framework to assure not only sufficient bulk for strength, but also proper hygienic contours and esthetics.

The surgical stent may also function

as a "radiographic-correction-stent". Radiopaque markers (eg. 5 mm. diameter metal balls) can be secured within the acrylic at the pre-selected strategic locations. The markers preferably should be located as close to the clinical ridge as possible and coincide with the preferred implant locations (**Fig. 5**). The "radiographic-correction-stent" is then seated in the patient's mouth while a panoramic film is taken (**Fig 6**). With this technique, the surgical specialist during the implant placement, can accurately correlate the optimal locations clinically and radiographically. (**Figs. 5 and 6**).

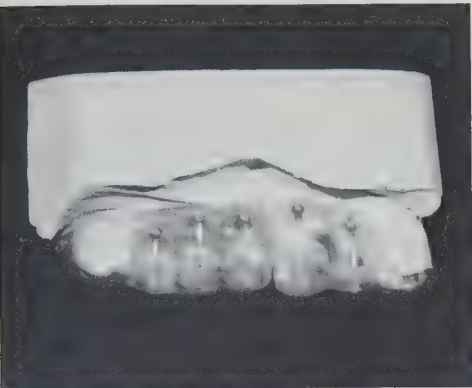


Fig. 5 — Buccal view of a "radiographic correction stent". Although 5 mm diameter metal balls can be used as "radiopaque markers", in this case orthodontic ball clasps were utilized. The markers should be positioned mesiodistally to correspond to the pre-selected implant locations. See Fig. 6 for the panoramic view with this appliance seated "in the mouth".

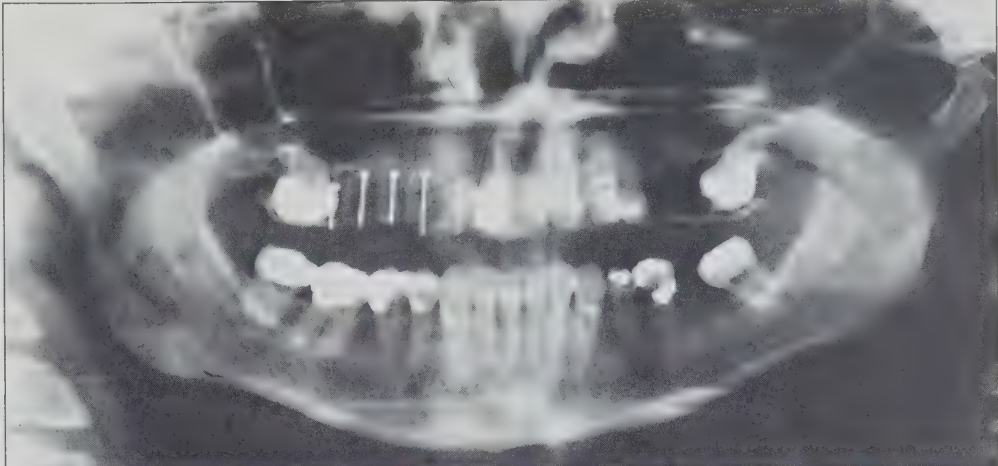


Fig. 6 — Panoramic radiograph of the appliance (as seen in Fig. 5) taken after securely seating it in the patient's mouth. With this appliance and radiograph, the surgical specialist can accurately relate any location on the osseous crest with the radiographically available bone height. This in turn allows the more precise selection of proper implant lengths and mesio-distal positioning.

Pre-surgically, once the radiographs have been completed, the stent may be strategically sectioned. During the initial implant surgery, either section of the stent can be easily removed (Figs. 7 and 8). This could be done after all the "starting points" have been transferred from the tunnel preparations in the stent to the crest of the bone via a coloured marker or a small notch made in the bone. Now with only one portion of the stent in the mouth, the appropriately-sized drill or guide is placed in the tunnel prepared in the acrylic that is adjacent to the edentulous area where the first bone preparation is to be made (Fig. 9). Now the surgical specialist has the ideal implant angulation indicated by the adjacent "guide" and with the previously made starting notch, can accurately angle the drill (assuming the available bone will allow this) in all three dimensions. Once the first site has been prepared, an appropriately-sized drill or guide is placed in the prepared bone site (Fig. 10), the other portion of the stent removed, and the remaining bone preparations carried out in a similar fashion. In the event that the osseous anatomy of the patient does not allow ideal implant placement, the stent may still be valuable as a guide during surgery in making a strategic implant positional change.

There may be cases where the patient is already wearing an interim fixed bridge that is bridging the implant area. In this situation, a second "bridge-like" surgical stent can be fabricated in a similar manner to the technique for the provisional fixed bridge. This stent or

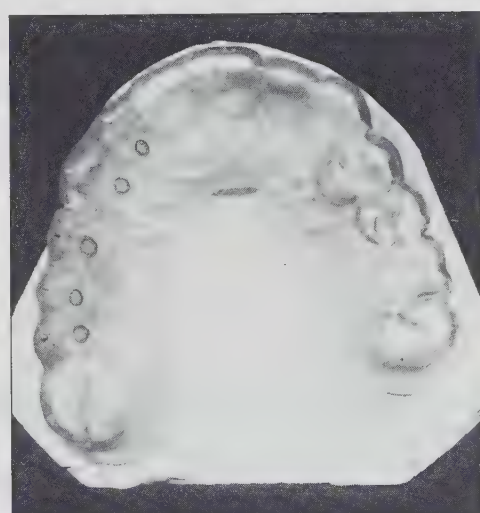


Fig. 7 — Occlusal view of the surgical stent (as seen in Figs. 5 and 6). This view demonstrates the tunnel-like preparation made through the acrylic, indicating the ideal implant positions. Note also that the stent has been strategically sectioned, thus allowing independent use of either portion after all the implant "starting points" have been transmitted from the appliance to the osseous crest.

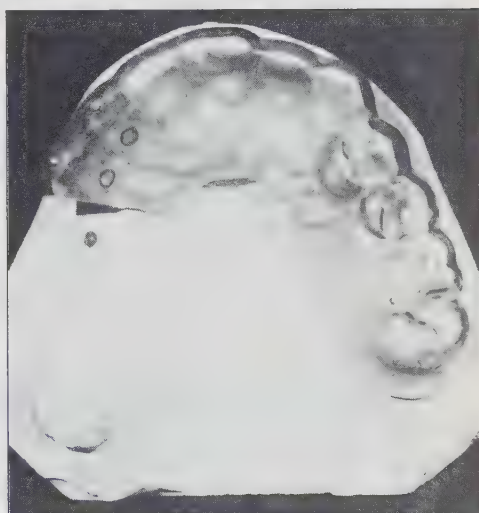


Fig. 8 — Occlusal view of the surgical stent (as seen in Figs. 5, 6 and 7), with one portion removed. This design allows the placement of an appropriate bur that can be securely fitted into the acrylic tunnel-like preparation prior to the initial osteotomy. This bur would act as a three-dimensional guide while preparing the initial implant site.

"duplicate acrylic bridge" is modified in the same way, i.e. drill holes placed in the appropriate pontics for the anticipated implant positions. At the time of surgery, the patient's interim bridge is removed for access, thus allowing the seating of the stent.

Summary

In summary, there is no substitute for thorough diagnosis, treatment planning, and meticulous surgical and prosthetic treatment. Proper utilization of surgical and radiographic correction-stents is one of the important aspects of the



Fig. 9 — Labial view of the surgical stent with a "paralleling tool" (Core-Vent Corporation) acting as a guide, for correct bur angulation when preparing the initial implant site.

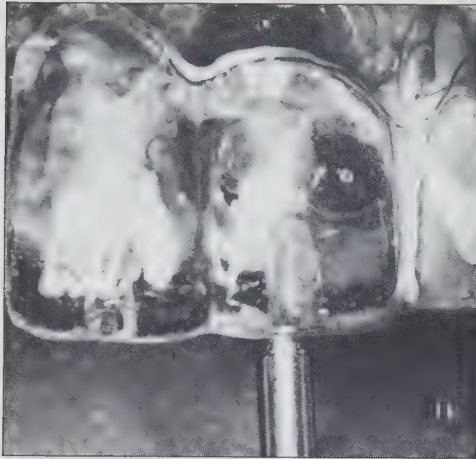


Fig. 10 — Labial view of the seated surgical stent after completion of the first osteotomy site. Note the paralleling tools (Core-Vent Corporation) in the stent and osteotomy site. The stent can now be removed and the paralleling tool in the osteotomy site can function as the guide for the subsequent osteotomies.

presurgical phase. The stents facilitate the accurate placement of implants in optimal positions where sufficient bone is present. In cases with insufficient bone, the stents may help in making a strategic alteration of the chosen implant site.

Dr. Arlin is an associate in dentistry at the Faculty of Dentistry, University of Toronto, and has a private practice in periodontics in Weston, Ontario.

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The City of Toronto's geriatric dental program

Jack Lee, DDS, MPH
Toronto, Ontario

INTRODUCTION

Current demographic projections suggest that the next 20 years will see a dramatic increase in the number and proportion of the elderly population in Ontario. Projections indicate that the number of persons aged 65 years and over will increase by 57.7 per cent during the period between 1986 and 2006.¹

For the City of Toronto it is expected that the proportion of the population 65 and over will increase from 12 per cent in 1986 to 21 per cent in 2000.²

AVANT-PROPOS

Selon les prévisions démographiques actuelles, on verra au cours des vingt prochaines années une spectaculaire augmentation du nombre et du pourcentage de gens âgés en Ontario. Ainsi, de 1986 à 2006, le nombre des personnes âgées de 65 ans et plus augmentera de 57.7 p. cent.¹

À Toronto, on prévoit que l'augmentation du pourcentage pour ce groupe d'âge passera de 12 p. cent en 1986 à 21 p. cent en l'an 2000.²

Dental Disease in the Elderly

While oral disorders are rarely disease-threatening, the oral cavity can have a significant impact upon social and psychological well-being.³ This part of the body is of primary importance in expressing thoughts and feelings and in communication, and so often reflects the most obvious signs of ageing. As a result, many of the elderly report substantial disability and handicap as the result of poor oral health.⁴

Studies of those 65 years and over had revealed that they have greater need for dental care than any other age group yet receive less professional attention. For example, the 1988 City of Toronto Community Health Survey found that only 54 per cent of those

55 and over had visited a dentist within the past year. Conversely, 24 per cent had not been within the past five years or more.⁴

A survey of independently living seniors in the Eastern Health Area of the City found that 69 per cent required some dental care.⁵ In an institutional setting, the situation was as grim. A Toronto survey in 1985 found that 53 per cent of the edentulous needed denture repair or replacement. Of the 31 per cent who were dentate, 22 per cent had caries and 98 per cent had gingival and/or periodontal problems.⁶

Dental Utilization by Seniors

The existence of such a need for treatment plus the excellent dentist/patient ratio in Toronto raises the question: Why are seniors not visiting the dentist?

First, there is the obvious impact that income, or the lack of an adequate one, has upon utilization. The City of Toronto Community Health Survey⁶ found that among those 55 years and older, 87 per cent of those with incomes of \$50,000 or more a year had visited a dentist within the last year, while only 32 per cent with incomes of less than \$10,000 a year had done so. As Bullen⁷ summarized in her 1980 survey: "Older Ontario adults are not low users of dental services because they are older, but because their incomes are lower...". However, money is not the sole deterrent to utilization. In the Eastern Health Area survey⁵ 71 per cent of those who had not visited the dentist in a year, claimed that it was because nothing was wrong. A survey of the literature by the author⁸ found that there was a low level of perceived need among the elderly regardless of setting. Further, the present cohort of seniors was approximately 50 years of age and older when preventive dental measures such as fluoridation, plaque control and sealants were gaining widespread acceptance. This lack of preventive

behaviour was documented in the City of Toronto Community Health Survey⁴ which found that only 12 per cent of those 55 years and over used dental floss or a water pick, and the Eastern Health Area Survey⁵ found that only 36 per cent of the seniors visited the dentist for what could be termed preventive behaviours. Additional deterrents to those listed above included fear and cultural differences.

Dental Services for Seniors

It was because of these attitudes, the perceived and actual needs and the relatively low utilization of dental services by seniors that the Toronto program was developed.

In June, 1985, an initial meeting was held between the author and representatives of the Toronto Mayor's Committee on Aging. After several months of work, a report was submitted to the Toronto Board of Health in October, 1985, which made dental health for seniors a priority in 1986. This report enumerated six principles of dental health for seniors, which it was felt were necessary to ensure appropriate dental health for seniors. They are: 1) Dental health is an essential component of the individual senior's well-being; 2) Dental health care should be an integral part of the health care system; 3) Dental services, preventive, educational and treatment, should be accessible to seniors. This is particularly true for those with special needs, the disabled, the homebound, and institutionalized; 4) Dental services for the elderly should be affordable; 5) Dental services should be offered in such a manner that is acceptable to seniors; 6) Dental services should be available to seniors regardless of where they live, the language they speak, or disabilities they may have.

Recognizing the magnitude of challenge to develop a complete program for seniors, a three-fold phase-in was established: 1) A city-wide dental health promotion campaign; 2) A mobile program for institutionalized

seniors; 3) Community clinics for low income seniors residing in the community.

The first element of the Senior's program was the establishment of on-going dental health promotion. Working closely with the Canadian Dental Association, the campaign was developed with the theme "What a Difference a Little Care Makes." Started in June, 1986, the primary aim is to increase awareness of the importance and value of dental health beyond 65 years. Various audio-visual materials in several languages have been developed. An important link with the Senior's Information Line sponsored by the Ontario Ministry of Community and Social Services allows for Widespread dissemination of information and educational materials.

The second component was the creation in September, 1987, of a Geriatric Dental Team, comprised of a dentist, hygienist and two assistants. The team is equipped with two mobile units. All consenting institutionalized seniors in Toronto have been examined. The 4,100 who consented represent 82 per cent of all residents. Of these, 42 per cent required and received preventive clinical services including the cleaning and labelling of dentures. A further 28 per cent required treatment, including denture repair and replacement. An active referral and follow-up mechanism exists for those identified to be in need of and capable of receiving treatment. Complementing this is an extensive educational component for care-givers and residents of the facilities. In January, 1990, an additional hygienist and two assistants were added to the team in order to reach all facilities on an annual basis.

The final target established by the Task Force was the low income senior living independently in the community. This represents approximately 30,000 individuals in the City of Toronto.

In November, 1989, the first of four community based geriatric dental clinics was opened. All should be operating by the end of 1990. These clinics will offer comprehensive educational, preventive and treatment services including endodontics, full and partial dentures. The clinics will be located in facilities that are handicapped-accessible, close to public transit and in facilities which provide health services, housing or other services to seniors.

Summary

The past four years have witnessed the development of a comprehensive dental program for the seniors of the City of Toronto. This program is based upon the principles of dental health promotion and prevention. It recognizes the distinct needs of seniors who are institutionalized. It also addresses the needs of those low-income seniors living in the community. The overall result is an integrated program aimed at improving the dental health of all seniors in Toronto. △

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Announcements

September/Septembre 1990

September 13-16: The Canadian Academy of Endodontics in conjunction with The College of Dental Surgeons of Saskatchewan present **SEPTEMBERFEST** Ramada Renaissance Hotel, Saskatoon. For more information, contact: Dr. Paul Teplitsky, Dental Clinic, University of Saskatchewan, Saskatoon, SK S7N 0W0. Tel.: (306) 966-5089.

September 22, 1990: The Alberta Academy of Periodontics presents current concepts and future trends in Periodontics. Speaker, Dr. Timothy Gould. For information contact: Dr. Peter Wooding, 502-8215 — 112 St., Edmonton Alberta, Canada, T6G 2C8

October/Octobre 1990

October 1: Winnipeg Dental Society sponsored course: "Aerobics Program For the Total Well-Being" by Dr. Ken Cooper. Registration Fee \$75. Contact: Dr. Philip Poon (403) 942-2438.

October 3-6: Sarajevo, Yugoslavia. The Sixth Yugoslav Congress of Orthodontists, will be held in the UNIS Business Centre Congress Hall, Burgundy Room, Pierre Fauchard Academy located in the Sarajevo city centre. For information contact: Unis/Tours, Congress Dept., 71000 Sarajevo, Trscanska 7, or call: 071/202-072, 202-094. Telefax: 071/513-611.

October 10-11, 1990: Tenth Annual Bristol-Myers Squibb/Mead Johnson Symposium on Nutrition Research. "The Biology of Feast and Famine: Relevance to Eating Disorders" is being organized by the Departments of Nutritional Sciences and Psychiatry, University of Toronto, under a Bristol-Myers Squibb/Mead Johnson unrestricted research grant. For more information call Francine Gingras, Bristol-Myers Squibb, 212/546-4616; or Sharon Padua, Bozell Public Relations, 212/484-7415.

October 10-13: American College of Prosthodontists Meeting — Charleston, SC: For more information contact: Ms. Linda Wallenborn, 1777 NE Loop 410, Suite 904, San Antonio, TX 78217.

October 11: American Academy of the History of Dentistry Meeting — Boston: For information contact: Ms. Aletha A. Kowitz, 211 E Chicago Avenue, Chicago, 60611.

October 11: Academy of Dentistry International Meeting — Boston: For information contact: Dr. Henry J. Sazima, executive director, 5125 MacArthur Blvd., NW, Washington, DC 2006-3315.

October 11-12: The Fourth Annual Bernard Jankelson Memorial Lecture and 1990 Fellowship Convocation will be held in Boston immediately preceding the ADA Annual Meeting. Dr. Joseph Kinselmann of Washington, D.C. and Dr. Gerald Murphy of Grand Island, Nebraska will be the featured speakers.

October 11-14: Annual Meeting of the Canadian Pain Society (IASP Chapter) in London, Ont. Contact: Ms. Inese Kramins, Local Arrangements Committee, Dept. of Psychology, University of Western Ontario, London, Ontario, N6A 5C2.

October 12: ICCMO'S 4TH Annual Bernard Jankelson Memorial Lecture and 1990 Fellowship Convocation will be held in Boston immediately preceding the ADA Annual Meeting. Dr. Joseph Kinselmann of Washington, D.C. and Dr. Gerald Murphy

of Grand Island, Nebraska will be the featured speakers. For information on registration, please contact the ICCMO International Headquarters, 830 Marsh & McLennan Building, Seattle, WA 98101, or call 1 (800) 446-1763.

October 17-21: American Society of Dentistry for Children — Meeting: For more information contact: Ms. Carol A. Teuscher, 211 E Chicago Avenue, Suite 1430, Chicago, 60611.

October 26: The Implications of Orofacial Pain and Temporomandibular Disorders to Dentistry sponsored by the Continuing Dental Education dept. at McGill University. Fee: \$175 For more information, contact: Mrs. Olga Chodan (514) 398-7221.

October 28-30: The Annual Meeting of the American Academy of Maxillofacial Prosthetics will be held at the Omni Hotel, Charleston, South Carolina. U.S.A. Guests fees for technicians and assistants are \$50 and for all others, \$150. For more information contact Dr. Nikzad S. Javid, Chairman, International Relations Committee of the American Academy of Maxillofacial Prosthetics, University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida 32610-0435 or Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, Ga. 30912-0200.

October 31-November 3: Annual Meeting of the Association of Prosthodontists of Canada in conjunction with the American College of Prosthodontists in Charleston, SC. Information may be obtained from Dr. Lawrence St. Pierre, Barrie, Ont (705) 722-1104 or Dr. Brian Kucey, Edmonton, ALTA (403) 468-7270.

October 31-November 3: The Annual Meeting of the American College of Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. Guest fees for technicians and assistants are \$50 and for all others, \$150. For more information contact Dr. Nikzad S. Javid, Chairman, International Relations Committee of the American Academy of Maxillofacial Prosthetics, University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida 32610-0435 or Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, Ga. 309102-0200.

November/Novembre 1990

November 2-3: The Ontario Dental Association Symposium '90 — "Bridging the Gap", to be held in Toronto: For information contact: Professional Development, The Ontario Dental Association, 234 St. George Street, Toronto, Ontario, M5R 9Z9 or call the ODA at (416) 922-3900.

November 16-18: Detroit Dental Review at the Hyatt Regency Dearborn. For more information, write the Detroit District Dental Society, 7430 Second Ave, Suite 420, Detroit, MI 48202 USA or call Marc Brown at (313) 871-3500.

November 22: Toronto Academy of Dentistry, 53rd Annual Winter Clinic, Metropolitan Toronto Convention Centre, 255 Front St. W, Toronto, Ont. For information, contact the Academy of Dentistry at (416) 967-5649.

November 23: 41st Annual General Meeting of the Ontario Public Health Assn in Scarborough. Contact: OPHA, 468 Queen St. E, Toronto, Ont. M5A 1T7 Tel.: (416) 367-3313.

January/Janvier 1991

January 13-18: 23rd International meeting of Federacion Odontologica de Centro America y Panama (FOCAP) in Panama. FOCAP combines the membership of the 5000 members of dental societies in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama. The combined meeting features world renowned dentists plus exhibits. Contact: Box 6777 Panama, 5 Panama. Tel.: (507) 64-3230.

January 17-20: Yankee Dental Congress Total Care Through Teamwork in Boston, MA. For more information, contact the Massachusetts Dental Society, 83 Speen St, Natick, MA 01760-4125 or call (508) 651-7511.

January 20-27, 1991: The Barbados Dental Association is hosting its Third Annual Dental Mid-Winter Convention plus Maxillofacial and Craniofacial Surgery Symposium. For further information contact: Alison Hoad (Mrs.), Travel Connection, 3rd Floor Cave Shepherd & Co. Ltd., Broad Street, Bridgetown, Barbados, Telephone: (809) 431-2060, Fax. (EO9) 431-2067.

January 24-25: Advanced Restorative Techniques sponsored by the Calgary and District Dental Society. Instructor: Dr. Alvin J. Fillastre. Fee: \$150. Contact: Dr. T. Smorang, 910-2303 4th St. SW, Calgary, ALTA T2S 2S7.

February/Février 1991

February 16-23: Virgin Islands Dental Association Convention in St. Thomas. For convention pre-registration and group travel and accommodation, please contact: Dr. Bob Brandon, 85 Lonsdale Dr., London, Ont. N6G 1T4 or tel.: (519) 657-3368.

February 17-20: 126th Midwinter Meeting of the Chicago Dental Society. Contact: Chicago Dental Society, 401 Michigan Ave, Chicago, IL 60611, USA. Tel.: (312) 836-7300.

March/Mars 1991

March 17-21: 26th Australian Dental Congress in Adelaide, Australia. For more information, contact: National Congress Office, P.O. Box 29, Parkville, Victoria 3052, Australia.

June/Juin 1991

June 10-14: 2nd Iberian-Latin American Congress on Preventive Odontology & 2nd National Congress on Pediatric Odontology in Havana, Cuba. For more information, contact: Federacion Odontologica Latinoamericana, Calle 4, No. 407 entre y 19, Vedado, La Habana, Cuba.

September/Septembre 1991

September 27-30, 1991: 13th Congress of the International Association of Dentistry for Children to be held at the Kyoto International Conference Hall, Kyoto, Japan. For information contact the Secretariat, 13th Congress of the International Association of Dentistry for Children, c/o Japan Convention Services, Inc., Sumitomo Seimei Midouji Bldg., 4-14-3, Nishitemma, Kita-ku, Osaka 530, Japan.

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Offices and Practices

BRITISH COLUMBIA—Central Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472.

(08-03/13)

BRITISH COLUMBIA — Surrey: Well-established, recently-renovated office for sale in Surrey, BC, 25 minutes from Vancouver. Present doctor and staff willing to stay on to ensure smooth transition. \$250+ plus gross with low overhead. Please call Bus.: (604) 590-2522 or Res.: (604) 594-9630.

(07-01/10)

BRITISH COLUMBIA — Victoria: well-established family practice for sale, located in a beautiful suburb of Victoria. Practice has a high gross-low overhead with a comfortable 4-day work week. Owner planning an early retirement for health reasons. This practice is located in the heart of some of the best fishing, sailing, golfing, and skiing in the world with a mild year-round climate. Please call: (604) 598-0809 or (604) 477-2565.

(07-03/10)

BRITISH COLUMBIA—Vancouver: Enjoy the great West Coast lifestyle! Very busy, growing family practice for sale. High gross, 28-hour work week, shared office for great net. 3 modern, equipped operatories, with ceiling tv's, Exan computer system for 5 years. Not inexpensive, but worth it! Serious calls only please. (604) 494-4303.

(08-05/13)

BRITISH COLUMBIA—Vancouver Island: Well-established and growing family practice for sale in "booming", beautiful Campbell River, the "Salmon Fishing Capital", with consistently mild temperatures and excellent half-hour flight connections to Vancouver. This progressive, modern, equipped 800 sq. ft. — 2 Ops, eight-window practice, provides lots of C & B, good gross and

low over-head. Will sell for half of last year's gross. Phone (604) 287-4016.

(06-01/09)

BRITISH COLUMBIA—Victoria and Gulf Island: Something different. 2 days a week in a children's hospital in Victoria. One day on each of two beautiful Gulf Islands. Great life style, low over-head, interesting work at a reasonable pace. Good gross. Call evenings, (604) 652-4970.

(06-08/13)

ALBERTA—Central: Thriving dental practice for sale. Population 13,000. Excellent four-operator office in modern building. Call (403) 672-3033.

(09-04/13)

ALBERTA—Edmonton: For sale. Busy, solo general practice in downtown area. Street level — excellent exposure, 2 operatories, practitioner returning to school. Exceptional gross income for 1989. High volume — active and new patients. Receptionist and assistant willing to stay on. \$150,000.00 FIRM Please reply to CDA Box 2496.

(09-21/10)

ALBERTA—Edmonton: PRACTICE FOR SALE. Established general practice. Five operatories, central location, low overhead. Telephone (403) 422-2783 (days), (403) 467-6887 (evenings).

(09-03/12)

ALBERTA—Fort McMurray: Oil resource capital of Canada. This is the one! Established 8 year general practice. Prime storefront location. State-of-the-art facility. Attractive due to constant modernization. Computerized ABEL/DYNA, 2700 solid patient profile, 760 sq ft, 3 identically-equipped operatories, 35 H/W with no extended hours, evenings or weekends yielding high average gross. Potential unlimited for 2 dentists + 2 hygienists utilizing facility 6 to 7 days per week. AVAILABLE IMMEDIATELY: (403) 791-7400 B or (403) 743-1789 R. Dentist has moved to Nevada and does not want to continue commuting.

(09-18/10)

SASKATCHEWAN: For sale or associateship leading to purchase of

excellent, very high gross family practice in medium-sized city. Six operatories with 4 x-rays and panelipse. Please call (306) 782-1528 after 5 p.m.

(09-02/13)

SASKATCHEWAN: Very busy, family-oriented practice for sale or associateship leading to purchase in small Saskatchewan city. Four fully-equipped operatories, including panelipse. Large patient base makes it suitable for 2 new graduates or 1 experienced dentist. Very reasonable selling price. Reply to CDA Box 2420.

(08-04/13)

SASKATCHEWAN: Practice for sale. Large rural Saskatchewan practice for sale. Buyer to take overlease as purchase price. Excellent opportunity. Please write CDA #2483.

(08-09/13)

ONTARIO — Etobicoke: FOR SALE. Long-established solo dental practice, very busy. Excellent opportunity for the right person. Owner is retiring. Please call (416) 845-3114.

(07-04/10)

ONTARIO — Hamilton: General practice requires a full-time associate with plans to purchase. Located on a public transit in a modern medical complex. Good lease, 1200 sq. ft. Three fully-equipped ops., fiber optics, panelips, auto-developper, etc. Presently 4 days a week, plus hygienist 4 days a week, plus associate 2 days a week. 1700 active patients. An excellent opportunity for the person who wishes to assume a full-time workload in a well-established practice. Present owner retiring due to health (arthritis). Please reply CDA, Box #2493.

(07-02/10)

ONTARIO—Kingston Suburb/Amherstview: For sale: Well-established general practice. Ground floor, 1200 square feet, four operatories fully-equipped Rapidly growing and expanding community. Owner is willing to associate for two and a half days a week. Please call: (613) 389-0538.

(05-16/09)

ONTARIO-Ottawa Valley: Family practice for sale. Established 23 years. Owner retiring — will associate. Hospital privileges, low overhead, no assignment, low receivables. Excellent recreation. Two operatories, 900 sq ft — air conditioning. Reply to CDA Box 2498.

(09-17/10)

ONTARIO — Southwestern: Busy, established, family practice for sale in small town near Lake Huron. Modern 30' x 50' building, air conditioned, two well-equipped operatories. Reception and business areas, lab, kitchen, bathroom, private office and staff room (or third operatory). Very competent, well-trained staff available with practice. Excellent income, low overhead. Please call (519) 482-5864.

(07-17/10)

ONTARIO—Toronto: ORTHODONTIST required for a largely adult downtown orthodontic practice. Very pleasant environment. Call Dr. Peter Gold, business (416) 928-9529, or home (416) 927-1796.

(06-02/09)

QUEBEC-Montréal: Bureau de dentiste à vendre. Situation idéale, rue Ste-Catherine coin Peel. Equipement moderne en bon état. Caxitron et air-flow autoclave, appareil de radiographie Procomat. Salle d'attente très élégante. Bureau privé luxueux. Clientèle et dossiers, pratique de 20 ans. SVP appelez Dr. Samir Chammas (514) 282-0740 ou (514) 483-2097.

(09-11/09)

Associateships Available

NORTH WEST TERRITORIES —

Yellowknife: Family practice requires an associate. Full book available in a busy practice located in a small northern town. Please send a resume to Box 2615, Yellowknife, N.W.T., X1A 2P9

(07-08/10)

BRITISH COLUMBIA: Busy practice in Central British Columbia, requires an

associate to start October 1990. We have a modern facility, with Panorex, hygienist and a full support staff. We are seeking an enthusiastic and caring dentist to join this practice. Would suit a new graduate as well as an experienced dentist. Please call: (604) 583-6662.

(07-05/10)

BRITISH COLUMBIA—Penticton: Full-time associate needed to assume patient load of departing associate July 1, 1990. Exceptional remuneration and opportunity future ownership, with own associate, in a busy, progressive, and well-established practice. Call (604) 492-6844.

(06-05/09)

BRITISH COLUMBIA-Salt Spring Island: Associate required for busy practice in the rapidly developing centre of Ganges in the heart of BC's southern Gulf Islands. A particularly lifestyle-conscious, interesting resort/retirement/artistic community in a rural, waterfront setting. Call Dr. Lorraine Machell at (604) 537-5293 evenings.

(09-10/09)

BRITISH COLUMBIA-Victoria: One of Canada's most beautiful cities. Associate required to take over existing case load and share new patients (approx. 140/month) in our total care, progressive practice. Large modern office currently has 3 dentists. Potential future partnership. Dr. Donald Bays Call collect (604) 381-6433 (w) or 595-8050 (h).

(09-05/11)

ALBERTA: Associate in vacationland Alberta. Excellent terms in very busy practice. Call (403) 849-2233 or (403) 849-4626.

MANITOBA-Winnipeg: Associate required immediately for an ultra-modern, 1 1/2-year-old general practice located in a well-established area of the city. Terrific opportunity for a new graduate! Call: Bus Manager Sandra (204) 832-0506.

(09-09/09)

ONTARIO-Barrie: Full-time associate

required for busy general group practice. Please contact Dr. Glenn Taylor. (705) 737-1201.

(09-16/09)

ONTARIO—Belleville: ASSOCIATE REQUIRED, full-time, for Belleville area offices. Progressive, preventive-oriented family practice. Bright, modern clinic facilities with excellent staff. Buy-in possibilities. Please call: (613) 466-2777, days or (613) 967-1016, evenings and weekends.

(06-03/09)

ONTARIO—Hamilton/Mississauga: Periodontist looking for part-time associateship in Hamilton to Mississauga area. Specialist or large progressive general practice preferred. Please reply to CDA Box #2491.

(05-12/09)

ONTARIO—Leamington: Associateship leading to ownership. We require a special person to join our rapidly expanding general dentistry practice in a recently completed, state-of-the-art facility. This individual must believe in clinical excellence, in the value of a team approach and in the importance of on-going continuing education. A full-time position is available immediately. If you are seeking a challenging and rewarding future in dentistry, please call (519) 322-2866 and ask for Lynn.

(08-10/09)

ONTARIO-Ottawa: Full-time associate required for busy, progressive office. Flexible hours, modern, family, preventative practice. Pleasant atmosphere, open concept. Located in Orleans, beautiful suburb of Ottawa. Please call (613) 824-7288.

(09-12/11)

ONTARIO: ASSOCIATE/PARTNER Opportunity exists with an exceptional staff to practice all phases of dentistry. Hospital privileges available. Located on the Trent River in scenic Campbellford. Call days (705) 653-2221 or evenings (705) 924-2864.

(09-15/13)

ONTARIO—Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent oppor-

tunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq ft. Modern facilities in professional walk-in medical-dental. Positions available June 1990. Call: (416) 452-7111.

(08-07/13)

ONTARIO—Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60 per cent associate percentage offered. Call (705) 522-4252.

ONTARIO—Toronto: Periodontist required for busy Periodontal office. Associateship leading to partnership. Please write CDA Box 2492.

(07-07/11)

QUEBEC — Montreal: Experienced Paedodontist seeks hospital position in Canada or international organization. Please write Dr. M. Marche, 3462 Cuvillier, Montreal, H1W 3B2, Québec.

(07-16/10)

NEW BRUNSWICK — Bathurst: Busy, established family practice for sale. Newly renovated office, 30 new patients per month with strong recall base. Owner leaving area and willing to negotiate price.

(07-14/11)

Auxiliaries

ONTARIO — Toronto: Periodontist required for busy periodontal office. Associateship leading to partnership. Please write CDA BOX 2492

(07-07/10)

Opportunities Available

BRITISH COLUMBIA—Nakusp: Ideal starter or retirement practice in beautiful Nakusp. Great life-style and low overhead. Call evenings (604) 265-4647.

(06-08/09)

BRITISH COLUMBIA—Prince George: Enjoy the great outdoors of the northern interior! Female dentist with 5 years experience in growing, general, family-oriented practice has an opening in a modern, computerized office for someone seeking a long-term arrangement with possibility of future buy-in. Reply to CDA Box 2479.

(03-01/09)

BRITISH COLUMBIA—Surrey: Excellent opportunity existing in extremely busy practice for the right individual who would like the team concept of dentistry. Please call Linda or Terrah to set up an appointment (604) 574-3522.

(09-14/11)

ALBERTA: Practice for sale. Alberta dental practice for sale. Very busy practice. Dentist retiring for medical reasons. Call (403) 849-2233 or (403) 849-4626.

(06-07/09)

ALBERTA—Calgary: ORTHODONTIST Successor required. Enthusiastic partner to assume eventual ownership in interceptive-oriented practice. No capital outlay required. Thriving downtown Calgary practice. Send resume and outline of practice goals to CDA Box 2497.

(09-13/09)

ONTARIO—Niagara: ENDODONTIST, PROSTHODONTIST. Large, modern specialist's office in St. Catharines has space available for a dedicated Endodontist, Prosthodontist or other compatible dental specialist. Excellent regional access to all parts of this 500,000 population underserved area. Opportunity for full- or part-time associate. Lease or buy-in potential. Please call (416) 687-3636.

ONTARIO—North Toronto: Position available immediately for a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426.

(08-06/13)

ONTARIO—Ottawa: Perio or Oral Surgeon wanted to share costs in existing, modern specialty office. Fully-equipped. Call (613) 725-2085 after 6 pm.

(09-06/09)

QUEBEC: Bilingual periodontist looking for a part-time associateship in a periodontal practice in the Montréal or South Shore area. Two nights a week or Saturdays. For more information, contact Dr. C.D. Alley. Phone home (514) 347-4724 or work (514) 358-7274.

(09-08/10)

Equipment

ONTARIO: EQUIPMENT WANTED Kerr Electro-torque Foot Control Motor and Hand Pieces NEW or USED. B. Garshowitz, DDS, 229 Yonge St, Suite 213A, Toronto, Ont M5B 1N9 (416) 368-3375.

(09-07/09)

QUEBEC — Montreal: Dental clinic and laboratory for sale. 2 operatories. Private parking with or without building. Front metro. Gross over \$200,000. Latin, Spanish, English, French, Greek, etc. clientele. Owner may stay to introduce buyer Please reply to CDA Box 2494.

(07-18/10)

Vacation Rentals

BRITISH COLUMBIA—Whistler: Three-to-four-bedroom townhouse in Nordic Estates. Three baths, Jacuzzi tub fully-furnished with deck and barbecue. Available for nightly, weekly or monthly rental. Please call, Dr. Ed Murdock, (604) 736-5850 or Dr. Ken Phillips, (604) 433-5756.

(05-04/13)

MEXICAN RIVIERA—Ixtapa: Pacific ocean view, 3 bedroom villa, 2 baths, air-conditioning, private pool, golf and tennis. 6 star hotel & restaurant next door. Call (519) 426-9140.

(09-20/12)

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Les candidats doivent détenir un diplôme de premier cycle en médecine dentaire, ainsi qu'une maîtrise ou un doctorat en dentisterie communautaire, en dentisterie préventive ou en épidémiologie. Il est souhaitable que les candidats aient une connaissance pratique du français ou soient disposés à apprendre cette langue.

Le titulaire devra notamment donner des cours de premier cycle en dentisterie préventive et communautaire et coordonner les activités des enseignants chargés de cours dans cette discipline. Le titulaire doit pouvoir trouver des fonds pour réaliser des recherches en dentisterie communautaire, en santé publique, en dentisterie préventive ou dans des domaines connexes. La classification et le salaire seront proportionnels au niveau d'instruction et d'expérience d'un professeur adjoint ou d'un professeur agrégé. Le titulaire aura accès à des installations de pratique privée, à l'intérieur du département.

Conformément à la législation canadienne en matière d'immigration, cet avis s'adresse au premier chef aux citoyens canadiens ou aux résidents permanents.

Les candidatures doivent être présentées avant le 1er décembre 1990, accompagnées d'un curriculum vitae détaillé et du nom de deux répondants, à l'adresse suivante:

**Dr. E.C.S. Chan, président
Comité de recrutement en
dentisterie communautaire
Département de biologie
bucco-dentaire
Faculté de médecine dentaire
Université McGill
3640, rue University
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See you in . . . BARBADOS!

'Abusable' procedures

I feel I must respond to the President's Column (May, 1990) concerning "abusable" procedures by dentists. The logic of his discussion escapes me. National and provincial dental associations and licensing bodies are in the position and have the responsibility, to act on these problems, and have clearly refused to do so.

Let me describe three general areas where these "professional bodies" have displayed a reluctance to act:

1. Use of Untrained Auxiliaries:

Without doubt this is an area of frequent abuse. There are many means whereby this problem may be reduced. The standard dental claim form recommended by the Canadian Dental Association could include a section which designates which dental staff member performed the billable procedure. Another method would have the licensing body acquire the work addresses of trained auxiliaries, which would allow analysis of Practice Profiles, to determine auxiliary abuse.

2. Dental Treatment:

Practice Profiles, certainly in the Province of British Columbia, have produced wide ranges of values in terms of the type of treatment, the frequency of treatment, and the amount of treatment, per patient, performed by dentists. Yet these almost always appear to be within acceptable limits by the licensing body. The licensing body (College) because of its inactivity, must view this problem as one of under-diagnosis by some dentists.

3. Dental Education:

Dental management courses exist, the ethics of which certainly appear to be questionable. For example, diagnosis is defined in these courses not to meet the patient's need but to meet the daily financial goals of the dentist. Dental radiology is not viewed as a diagnostic tool but as an "income generating centre". Even the upcoming CDA Convention features a program "to double production with existing patients". (Suddenly the patient's needs increase?)

Not only do our so-called professional bodies not discredit these courses, but actually reward participating dentists with continuing education credits!!

The time is long overdue for our "professional licensing bodies" to act in a professional manner.

*Dr. D.E. Gregory,
Summerland,
British Columbia*

ANNOUNCEMENTS

Continuing Dental Education
Dalhousie University
Halifax, Nova Scotia
October 20, 1990

ORAL MEDECINE

An Update On Medical Conditions of Importance in Dental Practice

(Co-sponsored by Dalhousie University and the Annapolis Valley Dental Association)

Presenters: Dr. Alan J. Drinnan
Style: Lecture and Participation
Audience: Dentists, Allied Dental Health Personnel
Location: Wolfville, Nova Scotia
For information contact Alumni Affairs and Continuing Education (902) 494-1674

October 24-27, 1990

NITROUS OXIDE CONSCIOUS SEDATION

Presenter: Dr. David Donaldson and Dr. J.T. Jastak
Style: Lecture and Participation
Audience: Dentists
Location: Halifax, Nova Scotia
For information contact Alumni Affairs and Continuing Education (902) 494-1674

October 27, 1990

PREPARING FOR THE OLDER ADULT

Presenters: Professor Joanne Clovis and Professor Terry Mitchell
Style: Lecture
Audience: Dentists, Allied Dental Health Personnel
Location: Halifax, Nova Scotia
For information contact Alumni Affairs and Continuing Education (902) 494-1674

November 3, 1990

INTEGRATING COSMETIC DENTISTRY INTO YOUR DENTAL PRACTICE

Presenters: Dr. Jacqueline Dzierzak
Style: Lecture
Audience: Dentists, Allied Dental Health Personnel
Location: Halifax, Nova Scotia
For information contact Alumni Affairs and Continuing Education (902) 494-1674

November 16, 1990

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Presenters: Dr. Jack Gerrow and Dr. Dan Macintosh
Style: Lecture and Participation
Audience: Dentists and Technicians
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November 17, 1990

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(Co-sponsored with the Nova Scotia Dental Association)

Presenter: Miss Anita Jupp
Style: Lecture
Audience: Dentists, Allied Dental Health Personnel
Location: Halifax, Nova Scotia
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November 30, 1990

THE EARLY DETECTION, TREATMENT, AND LONG TERM MAINTENANCE OF PATIENTS WITH THE PERIODONTAL DISEASES

Presenter: Dr Eric Freeman
Style: Lecture
Audience: Dentists, Allied Dental Health Personnel
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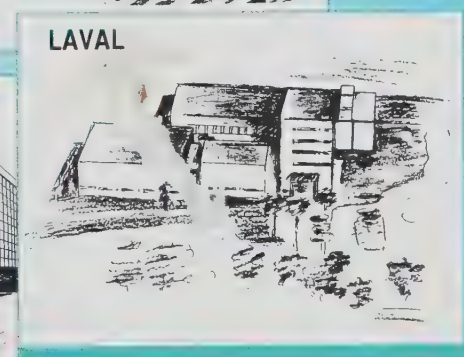
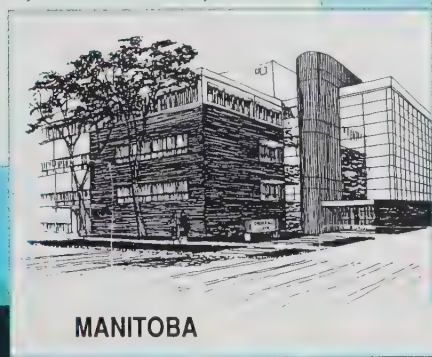
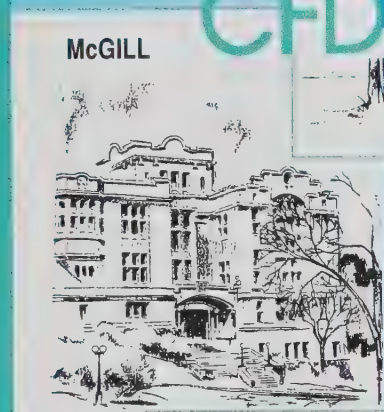
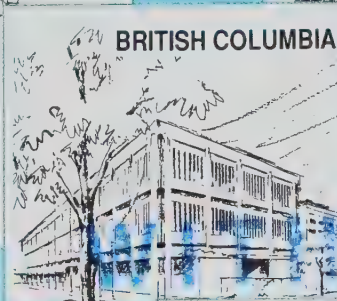
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JOURNAL



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▲ Octobre est le mois du FCED



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CDA MISSION STATEMENT

The Canadian Dental Association serves the dental profession — and through the profession the Canadian public — as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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[†] Supragingival Calculus Formation Study: "A Study to Compare the Effects of Two Dentifrice Products on Adult Supragingival Dental Calculus Formation" 1989. Data on file, SmithKline Beecham Canada.

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It's My Opinion!

"Sanguine About Sanguinaria"



This month's cover graphically illustrates the contribution of the Canadian Fund for Dental Education to Canada's Ten Faculties of Dentistry.

Designed by Louise Després-Jones.

JOURNAL



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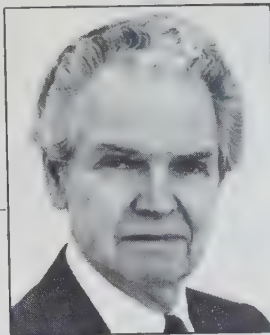
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Columns of support

Did you hear the riddle about how many people it takes to change a light bulb in Toronto (Vancouver, Calgary etc.)? The answer is: only *one* — the world revolves around _____ (your choice!).

Well, don't believe it. The world *does not* revolve around any particular city, region, or country. Nor does dentistry, in Canada or anywhere else, depend upon any one particular entity. Despite what some individual dentists or dental organizations may think, our dependency upon one another is crucial if not vital.

Dental organizations have been likened to a three-legged stool, each leg symbolically supporting a platform from which a united position may be proclaimed. One leg is the local society—it may be the Vancouver District Dental Society, the Winnipeg Dental Society, the Northern Ontario, North Toronto, Montreal, Moncton etc. It is the familiar, grassroots, closely knit body where most people are on a first-name basis. It has no legislative authority but its accessibility, emphasis on continuing education and social intercourse create a nidus for discussion and negotiation destined for greater levels. Without the local leg of support, any platform will "teeter".

The second leg strengthening the triad is the provincial organization. Not quite as "folksy" or familiar, it is more formalized than the local society. The provincial organization attempts to draw all dentists from a particular Canadian jurisdiction into a cohesive "whole". In some provinces it speaks for all aspects of the profession—the public and the dentists. In others, it is an association of dentists alone without legislative powers.

Size is not the issue. The provincial dental organization may be as small as Prince Edward Island's—56 dentists—or as large as Ontario with 6100 dentists. To the dentists in a particular province, the association is their support, their strength, the medium through which they contribute to the public's (and their own) well-being. Weaken this leg of the stool and the "teeter-totter" becomes very evident.

The two "legs"—one local, one provincial—each well-organized, each believing its role important, can be virtually impotent without a third column: a national organization. The three columns, rising to solidly support a unified platform, have the potential to effectively speak for all dentists—for all dentistry.

The profession pales without a brightly shining light illuminating dentistry's fulfillment of a future replete with superb dental health for all Canadians. That beacon will never pierce the darkness if the platform supporting it teeters and totters because even *one* column of support has been enfeebled.

The onus is upon each and every individual dentist to maintain all *three* columns of support—local, provincial, and national.

P. Ralph Crawford, BA, DMD

Editor: Journal of the Canadian Dental Association

President's Column



The Cornerstone of Progress

Have you ever wondered how a government body or association like CDA chooses a specific project and plans its implementation? Let's use EDI (Electronic Data Interchange) as an example of how your national association decides to go ahead with a new venture. I'm sure you'll agree with me that EDI is one of the most exciting, forward-looking projects CDA has ever designed. Tremendous efforts on the part of our permanent staff and our volunteer dentists were devoted to studying EDI's feasibility. Controversial in the minds of a few, EDI is an innovative programme that will position Canadian dentists among the most technologically advanced in the world. In today's world, the ever-increasing role of computer technology has become a familiar feature of our daily lives. For the practising dentist, the logical next step is the ability to electronically exchange data – and EDI will easily equip us to do just that.

CDA's involvement in the wonderful world of electronic exchange of information was seriously considered at a recent planning session convening Executive Council and senior staff. It came to this – What would be better: to allow the insurance industry – which planned to go ahead with it, whatever our decision – to take responsibility for implementing the project; or, to take the lead and protect the free practice of Canadian dental medicine?

CDA decided in favour of the latter. Its position was clear, and so was its responsibility to become part of this all-encompassing trend – a trend that we must ultimately lead in order for us to benefit from it. Our response was dictated by the imperative to be **present at**, not absent from, a discussion that so closely affected our professional lives; not merely to "stand up and be counted", but to "stand up and point the way."

Part of the impetus of that imperative came from Executive Council's awareness of the influence exerted by third parties on American dental services. Strong national leadership was essential in order to avoid a similar experience in Canada. The future of practice management was at stake – nothing less. Playing ostrich would gain us nothing. The hope that "others" would be considerate and present us with an ideal project on a golden plate was disingenuous. With this leadership agenda in mind, we consulted with the provincial associations. (CDA never operates in a vacuum.) We wanted to ascertain how and to what extent EDI would meet their needs. The overall response was enthusiastic and supportive.

The next step involved studying all the aspects of the programme, identifying possible pitfalls, assessing different approaches, and evaluating the costs/benefits for dentistry. A drive towards perfection marks involvement in any project, and we wanted a programme in which the profession would have perfect control of all the elements. But the realities of professional practice are such that other parties inevitably get involved. It was evident early on in negotiations with the insurance industry that they wanted some share in controlling the programme. Some compromise was necessary – BUT CDA ensured that all and any compromise had to be acceptable for **all** involved parties. We achieved a workable agreement, like good partners.

Our American friends saw this as somewhat miraculous. A few months ago, when our Management Committee visited ADA Headquarters in Chicago, their reaction was one of wonder that we could have gathered all the insurance people together to reach this agreement. Yes, envious is a word that would apply.

So now, after more than two years of effort, consultation, and negotiation, we've reached the final stage. I don't want to give the impression that EDI is perfect: that it presents solutions to all problems and answers all needs. We know that no project is perfect – what in life is? However, EDI is the cornerstone of progress that will evolve according to our changing needs. With your input and our commitment to its success, EDI is sure to become a mainstay of our profession.

Gilles Dubé, DMD., MS., Ad. Santé
President of the Canadian Dental Association

October is CFDE Month

In October 1962, several forward-looking members of the profession and officials of related enterprises had a vision... A vision to advance the future of dentistry by supplying badly needed funds for dental education and research... A vision to provide sufficient expert manpower to supply the Canadian public with the dental health services it both needs and wants. Funding from the dental profession and the dental industry made this dream a reality... and the CFDE was born.

Today we can say with pardonable pride that we have taken some giant steps forward. Up to now, \$3 million has been granted to the programs that benefit dentistry most. In the next decade, we confidently expect to do at least as much—or more—for our profession.

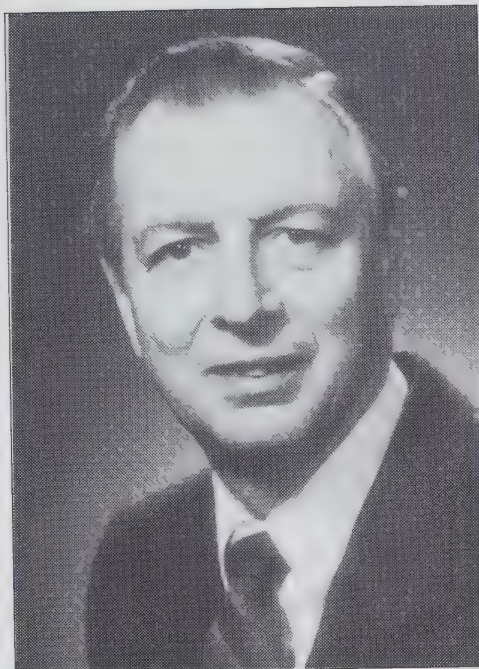
But one step at a time. This year, a minimum of \$93,000 in personal contributions from dentists is needed if we are to move ahead as we should. I know we can meet and exceed this goal with your support.

The aim of the **Canadian Fund for Dental Education** is embodied in its title. The CFDE helps to improve the quality of dental education throughout Canada and, to that end, it seeks, in the longer term, to improve the quality of dental care for all Canadians.

If it is to achieve these objectives, the CFDE has two roles to perform successfully: raising funds and carefully dispensing them. If the Fund is to continue to enjoy its longevity, the first has to precede the second.

Some of the major grants approved by the Trustees for 1990 include:

- \$45,000 towards **dental awareness programs**;
- \$26,000 for **teacher/researcher training awards** benefitting a total of eleven dentists and hygienists in their pursuit of teaching and research careers;
- \$35,000 in grants to the **ten dental faculties**;



Ted E. Ramage, DDS, FICD, FACD
Chairman, Canadian Fund for Dental Education

- \$63,000 in **research, teaching, and students' conferences**;
- \$11,000 towards the **student table clinic program**;
- \$10,000 towards a **research publication dealing with**

substance abuse;

- \$4,500 to sponsor the annual **Murray McDonald Memorial Lecture**.

All of the approved projects are designed to advance dentistry through research. These and other awards will provide \$234,000 of badly needed assistance this year—that's 9% more than in 1989!

Each year, the CFDE receives letters of appreciation from individuals who have benefitted from CFDE support. One of the many letters from participants of the Association of Canadian Faculties of Dentistry Summer Teaching and Management Institute reads:

"Sharing ideas with dental faculty across the country was inspirational and the intensive workshops on teaching methods were enlightening. The Institute emphasized active, humanistic teaching, taught me good organizational skills, encouraged me to use clear objectives, and taught me how to make my evaluation of students a meaningful learning experience."



1990 CFDE Annual Board Meeting. Front row (left to right): Dr. Louis Bernier; M. Robert Cajolet, Vice-Chairman; Dr. David Singer; Mr. Lee Maddison; Back row: Mr. Jardine Neilson, ex officio; Dr. Gregory Baird; Dr. Arnold Steinbart; Dr. Ted Ramage, Chairman; Dr. Donald O'Connor; Dr. Bill Sharun; Dr. Gordon Thompson.

Another states:

"I have been in private practice and never fully understood where the funds were being allocated. After attending the ST/MI course this summer, I can say that the funds were well spent on this program! My understanding of the dental education process is greatly enhanced and I feel confident going into a teaching career now."

From a CFDE Fellowship recipient:

"I was pleased to receive word that I had received a CFDE scholarship for my academic year. More than a generous financial award, these scholarship are recognition that a student's hard work has paid off."

During the month of October, the CFDE will once again be asking for your support. Approximately 15,000 dentists will receive letters asking for their contribution to CFDE's programs and goals benefitting dental education and research.

Your support is vital, because where dental health is concerned, everyone looks to dentists for leadership. Your cheque in October will ensure a brighter future for dentistry and dental education. PLEASE GIVE GENEROUSLY.



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The Canadian Academy of Periodontology Holds Successful Montreal Meeting



Academy President, Dr. Miller, addresses the annual business meeting, and welcomes the President of the American Academy of Periodontology, Dr. Gary Maynard, as well as AAP's Executive Director, Mrs. Alice DeForest.

The Canadian Academy of Periodontology concluded one of its most successful meetings in Montreal in the late Spring of 1990.

International speakers as well as Canadian researchers were highlighted. Drs. Jay Seibert, David Garber, Preston Miller, and Gary Reiser were among the highly respected American and international speakers. Dr. Michel Brecy of the University of Manitoba was also present. Dr. Brecy is renown for his distinguished work in the field of periodontics.

The Academy also elected the new Executive for the next year...
President:

Dr. Malcolm Philip Miller,
Calgary, Alberta

Pres-elect:

Dr. Daniel Morrow,
London, Ontario

Secretary:

Dr. Robert Fortier,
Sherbrooke, Quebec

Treasurer:

Dr. Peter Munns,
Vancouver, B.C.

Editor:

Dr. Marvin Budd,
Toronto, Ontario

The Academy invites all Canadian dentists to participate in the Toronto meeting in the Spring of 1991 which promises to be one of the largest and most comprehensive meetings on **Geriatric Dentistry** held on the continent. The meeting will be coordinated through the Academy and the University of Toronto and will place Canadian dentistry in the forefront of this exciting and growing field. △

Corrigenda

The Journal, July 1990:

The credit line for "Ontario Dental Assistants' Job Satisfaction: Relationship to work stress and intention to change jobs," (p. 617-620) should have included the names of co-authors, **D. Locker**, BDS, PhD., and **D. Otchere**, DDS, as well as **D. Burman**, DDS, DDPH, MSc. The reading order of the tabular information in **Table III** may have led to ambiguity. The "mean" column should precede rather than follow the "s.d." column.

The Journal, August 1990:

Two Figures in the article "Quebec Dental Manpower and Demand for Dental Care from 1985-1988" (p. 773-776) were transposed. Figure 5 (Percentage of Quebec and American Adults Visiting the Dentist Annually According to Age in 1985) should have been followed by the graph printed below the Figure 2 heading. Figure 2 (Percentage of Adults Visiting the Dentist Annually According to Age in 1985 and 1988) should have been followed by the graph printed below the Figure 5 heading.

CORRECTED POSITIONS:

FIGURE 5

Percentage of Quebec and American Adults Visiting the Dentist Annually According to Age in 1985

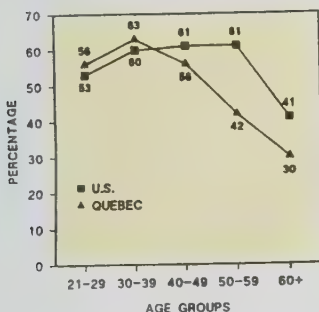
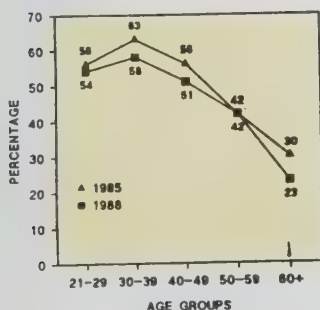


FIGURE 2

Percentage of Adults Visiting the Dentist Annually According to Age in 1985 and 1988.



NEW BRUNSWICK DENTAL SOCIETY CELEBRATES CENTENNIAL



New Brunswick Dental Society 1990-1991 Officers, left to right: Dr. J.G. Thompson, Executive Director/Registrar; J.L. Rioux, Vice President; Dr. Paul Castonguay, President; Dr. Luce Marchand, President Elect; Dr. John Rooney, Past President, and Dr. Bob Murray, CDA Governor.

When the New Brunswick Dental Society held its annual meeting on May 5, 1990 it marked a memorable milestone — it was the 100th meeting of the Society, founded in 1890.

The meeting, held in conjunction with the Atlantic Canada Chapter of the Academy of General Dentistry's tenth anniversary, featured a presentation on AIDS and Infection Control by Dr. Ray Wenn of Charlottetown and a lecture on Cosmetic Dentistry by Dr. Robert Nixon of California.

Dr. Kevin Roach, CDA President, brought greetings from the National Association and presented an update on CDA programs and activities. He emphasized CDA's position on the impending GST legislation. Dr. Bernard Dolansky, CDA Governor from Ontario and Chairman of the sub-committee on EDI, outlined the impact of the electronic data interchange system.

Life Memberships to the New Brunswick Dental Society were presented to Drs. C. Hayward and E.

Halford. Dr. R.B. DeWare of Moncton, Dr. Gil Daigle of Edmundston and Dr. J.A. MacDougall of Saint John received Honourary Memberships.

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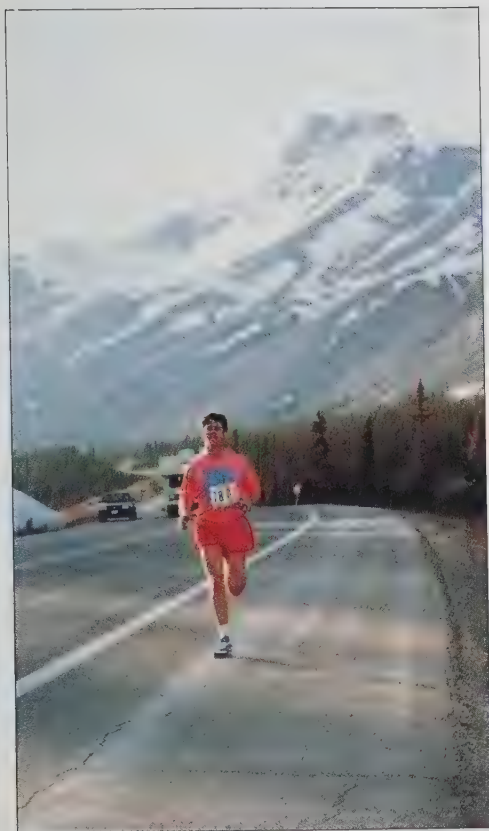
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MOLAR MILERS Dentists on the Run

The Canadian Airlines Jasper-Banff Relay, a gruelling 284 km 17-stage footrace through the Rocky Mountains, takes place every year on the first weekend of June. One hundred and twenty teams from around the world start running at noon on Saturday in Jasper and run through the night to finish sometime Sunday morning in Banff. For the past three years this challenging race has been the main event for a group of dentists from Ontario appropriately named the "Ontario Molar Milers."

The Ontario Molar Milers evolved from the original Molar Milers, a group of Alberta dentists who were organized and inspired by Dr. Roger Ellis, an avid runner himself. In 1988, the Ontario Molar Milers made their first trip to the mountains, finishing a respectable 42nd. In 1989, two "Molar Miler" teams were entered with "Ontario" just edging "Alberta", finishing 34th and 35th respectively. In 1990 "Ontario" fared even better with a 25th place finish.



1989 Dr. David Gainey near the Columbia Icefields.



1990 Ontario Molar Milers

Top Row (L to R.) Pierre Maranger, Steve Burrows, Jim Rogers, Kris Row, Jim Davis, John Grant, Art Shellnutt, Ron Pileski, Eric Piscopo, Steve Buck.
Front Row: Paul Thomas, Steve Schneider, Mike Bulger, Mark Santana, David Gainey.
Missing Rick Rayman, Bruce Pellow.

You might ask, "Why would anybody want to run ten miles in the middle of the night in the Rocky Mountains?" For those dentists who committed themselves to the Molar Milers with countless hours of training, and the time and cost of travelling, their efforts and sacrifices were well rewarded. Even running in the middle of the night was okay (the rest of the team was awake and cheering anyway!). Here are just a few of the reasons:

First is the experience of athletic endeavour. Some of the team members are amateur athletes, but most Molar Milers are just recreational runners. In other words, the couch potatoes got fit while the already fit saw their fat friends get skinny! Regardless of ability, though, all of us enjoy achieving goals through teamwork.

The second reason for the Molar Milers' success is that every team member spends the entire weekend saying and hearing: "Keep it up!"; "Way to go!"; "Great run!" etc. The positive atmosphere created by the

team is a far cry from the day-to-day lives of most of us (a lesson to be learned!).

Finally, and most important, the team camaraderie that builds throughout the entire race transforms strangers into friends and cements the bonds of old friendships. That's why so many Molar Milers return year after year!

Distance running isn't for everyone but the Ontario Molar Milers would certainly like to see dentists from other parts of Canada take up the "Jasper Banff" challenge. As for 1991, we're shooting for the top 20!

If you're interested in fielding a team, contact Eve Campbell at Canadian Airlines (403) 428-8525. If you're interested in joining the Ontario Molar Milers in 1991, contact Dr. Mike Bulger at (416) 922-6848. △

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First Teeth: the award-winning program from the Canadian Dental Association that helps you help parents care for their children's dental health. Supervised by a team of experts in children's dental care, sponsored by Colgate Junior, First Teeth is the CDA's most popular program ever. And its best-loved.

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The First Teeth growth chart for children is stacked high with wonderful drawings and fun facts. Kids love First Teeth because it makes dental health child's play.

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First Teeth lets you drive your prevention messages home. Lots of homes. According to the figures, First Teeth has been provided to hundreds of thousands of Canadian parents. You'll love First Teeth for the same reason almost six thousand dentists and dental hygienists do: it's working.

Order Now

- Patient Package (booklet and growth chart): 25 for \$25.00 (\$50.00 CDA non-members); 50 for \$40.00 (\$60.00 CDA non-members)
- Office Package (communication guide, special office poster, sample booklet and growth chart): \$15.00 (\$30.00 CDA non-members)

To order, simply call one of the toll-free numbers below (please have your VISA or Mastercard ready):

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1-800-267-6354

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1-800-267-6364



Thanks, Colgate Junior: As exclusive sponsor of First Teeth, Colgate Junior is helping to bring CDA's prevention messages to young Canadians. CDA is grateful to Colgate Junior for its ongoing support of the program.

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DENTAL HEALTH
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Applications Invited 1991 FDI/Unilever Table Clinic Awards

Anyone working in the field of oral health who registers for the FDI Annual World Dental Congress (Milan), October 7 to 13, 1991, is invited to submit applications for the Table Clinic Awards. The annual award is intended to recognize original and innovative ideas and techniques. The winner will take home an inscribed silver salver and \$3,000 US. Second and third prizes are also awarded, worth \$2,000 and \$1,000 US, respectively. In addition, the top fifty applicants will be selected for a Table Clinic Competition to be held during the FDI Congress proceedings.

Two enrollment forms and a presentation summary of 150 words or less must be received at FDI Headquarters no later than March 15, 1991. Apply to: *FDI/Unilever Table Clinic Awards, FDI Headquarters, 64 Wimpole Street, London, W1M 8AL, UK*, or to your national Treasurer for competition regulations and Congress enrollment Forms A and B.

For further information regarding these and other FDI-administered competitions, contact: *Caroline Southey, Public Relations Officer or Sabina Webber, Assistant Public Relations Officer, at the above address, or call: London (071) 935-7852. Telefax: London (071) 486-0183. Δ*

CDA Retirement Savings Plan

Unit values: (Funds are valued weekly)

Fund	Unit values as at	
	August 31, 1990	July 31, 1990
Bond & Mortgage Fund	74.83778	73.35453
Common Stock Fund	15.64530	15.99924
Money Market Fund	51.78432	51.07771
Balanced Fund	29.58407	29.80247

G.I.C. Fund Term	*Interest rates as at	
	August 31, 1990	July 31, 1990
1 yr	12.15%	13.00%
2 yr	11.85%	12.55%
3 yr	11.75%	12.35%
4 yr	11.50%	12.05%
5 yr	11.50%	12.05%

(*rates subject to change without notice.)

Total Assets (Market value) of the Plan as of:

August 31, 1990	July 31, 1990
\$124,126,081.10	\$124,134,047.70

For further information:



Write:
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Retirement Services Dept.
Suite 600
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Metro Toronto Area 497-7117

Obituaries/Nécrologie

Bird, Roland. On July 14th, Dr. Bird, know as «Rollie», passed away quietly. He was in his 93rd year. Born in Victoriaville, Quebec, and raised in Kenora, Ontario, Dr. Bird served with distinction as a stretcher-bearer in the First World War. He was awarded the French *Médaille Militaire* in recognition of his valour. After the War, he returned to Canada and entered the University of Toronto Faculty of Dentistry. After graduation in 1923, he began a private dental practice in the Winnipeg suburb of Elmwood, which he continued for 48 years.

Bird, Roland. Le 14 juillet dernier, le Dr Bird s'est éteint à l'âge de 93 ans. Il était né à Victoriaville, au Québec, et il a été élevé à Kenora, en Ontario. Durant la Première Guerre mondiale, il s'est distingué comme brancardier et sa vaillance lui a valu la Médaille militaire de la France. Après la guerre, il a fait ses études de médecine dentaire à l'Université de Toronto et y a obtenu son diplôme en 1923. Pendant 48 ans, il a été praticien privé à Elmwood, en banlieue de Winnipeg.

Campbell, Harvey Reid. After a long illness, Dr. Campbell passed away at the age of 69 on April 23rd at his home in Kingston. A Life Member of the Canadian Dental Association, Dr. Campbell was also a member of the Kingston District Dental Society.

Joubert, Emile. Diplômé de l'Université de Montréal en 1935, le Dr Joubert a exercé au Québec. Il est décédé à l'âge de 84 ans.



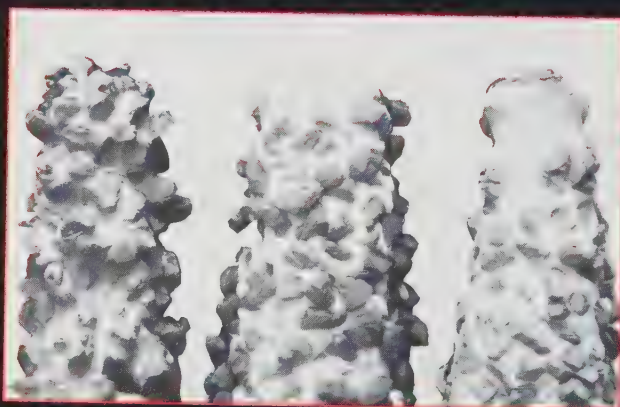
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Award for Cancer Project

1990 Johnson & Johnson Award Goes to Sri Lankan Dentist For Oral Cancer Project

Professor K.A.A. Samen Warnakulasuriya of Sri Lanka was the handsdown winner of the 1990 Johnson & Johnson Award for Community Programmes. Administered by the FDI and sponsored by the Johnson & Johnson Dental Care Company of New Jersey, this worldwide competition grants recognition to innovative work in oral health.

A variety of entries from both industrialised and developing countries were evaluated by an international jury comprised of judges from Argentina, Canada, and The Netherlands.

Dr. Warnakulasuriya's project was aimed at primary and secondary prevention of oral cancer in high-risk population group. Through an integrated health education programme, the project promotes lifestyle changes in habits linked to oral cancer, such as the chewing of betel nuts and tobacco. △

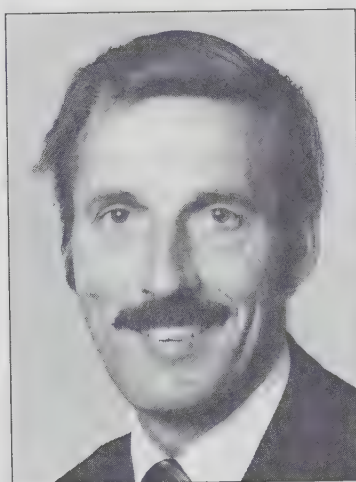
Dr. J.H.P. Main IAOP Tokyo Congress

Dr. J.H.P. Main (*Journal Specialty Editor, Oral Pathology*) presided at the 5th Congress of the International Association of Oral Pathologists which was held in Tokyo from July 2nd to 5th, 1990. The Congress was attended by over 500 people from 26 countries. While in Japan, Dr. Main also lectured to the Japanese Society of Oral and Maxillo-Facial Surgeons and at two universities. At the end of the Congress, Dr. Main relinquished the office of President of the Association which he has held for the last two years.



Dr. J.H.P. Main

Dr. Derek Jones Appointed to National Advisory Panel on Advanced Industrial Materials



Derek W. Jones

For the first time at the national level, a private sector advisory panel will be considering the materials science and technology issues which are critical for Canada's continued economic prosperity. Dr. Derek W. Jones, Professor of Biomaterials Science at Dalhousie University will serve on the fourteen-member panel drawn from a

wide spectrum of materials technology suppliers and users as well as the financial and legal communities.

Dr. Jones heads up a team of researchers at Dalhousie University who are developing improved biomaterials. His contributions in the area were recognized in 1988 when he received the Distinguished Scientist Award from the International Association of Dental Research. Dr. Jones stated that, if Canada is to attempt to compete in the strategically important high-tech field of advanced materials, we must harness our efforts into a coherent program and a planned direction. "If we do not do so, we will be abandoning this critical field to others. The challenge is to turn this opportunity in a reality", he said.

In making the announcement of the Panel in Ottawa, the Honorable William C. Winegard, Minister for Science, said, "Canada's traditional materials-based industries are being challenged by the emergence of new technologies. All manufactured products, from automobiles to sporting goods, are being made from different materials than they were ten years ago. Canadian firms must respond to these trends by applying new materials and processing technologies to add value to their products and diversify their markets. We will look to this Panel to provide leadership in creating a business strategy to promote private and public investment in materials technology to increase the competitiveness of Canadian industry." △



A CFDE Thank You

On behalf of the **Canadian Fund for Dental Education**, I would like to express our sincere appreciation to Dr. Ralph Crawford and the CDA Journal Staff for their continued support of the Fund in publishing CFDE articles and advertisements throughout the year.

We have come a long way since the CFDE's inception twenty-eight years ago in helping to improve dental health for all Canadians, and we have been fortunate to have had the backing of the CDA Journal every step of the way.

We, at the Fund, know that without your valuable support, we could not succeed in informing the dental profession and dental industry on the important work of the CFDE.

It is a pleasure to be associated with your excellent publication. Our hats are off to you!

Ted E. Ramage
Chairman
Canadian Fund for Dental Education

Did you know?

It pays to work on Christmas day

A survey of some
Western Canadian jobs showed
there is money in
"them thar Christmas stockings"...

On a typical Christmas-Day bus route of 665 kilometres in Saskatchewan a bus driver earned double time, about \$385.00 for the day.

An emergency-room nurse in Winnipeg earned time and a half on December 25th. Regular time is \$13.45 per hour so the holiday away from the family added up to \$242.00 for a 12 hour shift.

The telephone operator in Alberta earned no less than triple time! The regular hourly rate of \$11.85 produced a healthy \$248.85 for Christmas spent saying "Operator, can I help you?"

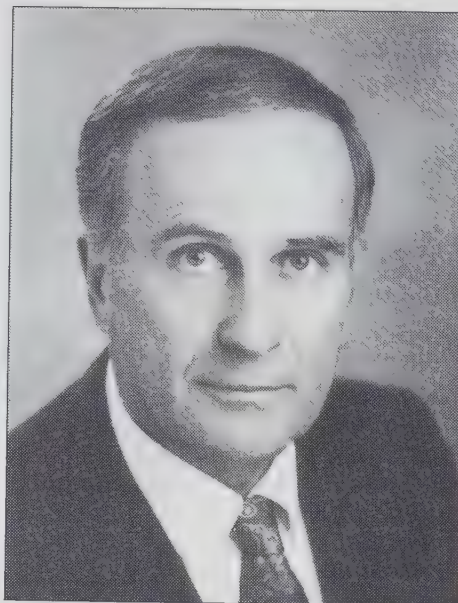
The Executive Director of the Edmonton Addictions and Social Services Centre and his wife, plus five other Salvation Army officers received NO extra pay for working at the hostel on Christmas Day. They received their regular hostel-worker daily rate of \$43.84 for feeding 300 men and distributing gifts from Santa Claus.

ERRATUM

The Journal Editor and his staff were mortified to discover that the July 1990 issue of the Journal included a note announcing the nomination of Dr. Richard L. Pass to President of the Canadian Association of Orthodontists. Dr. Pass, as everyone knows, was the Association's President for the 1989-90 term and is now Past-President. Dr. Yale Malkin is the current President. Elections for executive positions will be held at the upcoming Annual Scientific Session.

The Editor sincerely apologizes for the error and hopes that Association members realize that his unutterable embarrassment was punishment enough.

Alberta Dental Association Elects New President



*Dr. G.D. Harle
president of the
Alberta Dental Association*

Dr. G.D. Harle was recently elected President of the Alberta Dental Association for a one-year term of office effective July 1, 1990. Dr. Harle relieves Dr. W.G. Mabey from the position.

Along with Dr. Harle, the new Executive Officers of the Alberta Dental Association were also named: Dr. W.G. Mabey, Past-President; Dr. G.P. Greeves, President-Elect, and Dr. J.W. Blair, Vice-President.

After receiving both his B.Sc. and D.D.S. degrees from the University of Alberta, Dr. Harle began a private practice in Salmon Arm, British Columbia, in 1962. During that twelve-year period, he was Director of the Inaugural Board of Directors of Okanagan College in Kelowna, B.C., Chief of Dental Service at the Shuswap Lake General Hospital, and sat on the B.C. College of Dental Surgeons' Hospital Advisory Committee.

In 1974, Dr. Harle earned a M.Sc. degree in Orthodontics from the University of Alberta. He began practising Orthodontics in Edmonton in 1976 which he continues to this day. A year after he opened the Orthodontics practice, Dr. Harle was invited to lecture on a part-time basis at the University of Alberta. A mutually

satisfying arrangement, he continues as Guest Lecturer in Orthodontics for U of Alberta.

Dr. Harle's commitment to dentistry at both provincial, regional, and municipal levels is evident from his many appointments to positions of senior responsibility. In 1980, he was elected President of the Alberta Society of Orthodontics and became a member of the Western Canada Orthodontic Society. In 1982, he was named President of the Edmonton and District Dental Society, a post he held until 1983. In that year, he sat on the Edmonton Board of Health as Director. As of 1984, he has been a member of the Alberta Dental Association Board of Directors.

In addition to his wide-ranging career in dentistry, Dr. Harle has found time to acquire a private pilot's license (he has his own airplane). He was also a member of the *Molar Milers* long-distance relay team (see **News** story, page 00) for six years and is a licensed judo instructor. An avid runner, he participates in 10K runs and other relay races and has coached minor hockey, bringing at least one team to national finalist status. Suffice it to say that Dr. Harle is a man for all seasons. △

Substance abuse and the dentist

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2. Bowermaster D.P. "Chemical dependency: effects on practice and personal health." *West Virginia Dental Journal*. Jan. 1989; v.63, no. 1, pp. 10-11.
3. Bowermaster, D.P. "Treatment of the chemically dependent dentist." *Ohio Dental Journal*. Fall 1988, v.62, no. 10, pp. 40-2.
4. "Case no. 1: A near fatal combination."
"Case no. 2: A foolish capacity."
"Case no. 3: An inherited problem."
"Case no. 4: The power of understanding."
Journal of the California Dental Journal. Feb 1990, v.18, no. 2, pp. 25; 49; 55; 61.
5. Clarke, J.R. "Chemical dependency among dentists: prevalence and current treatment." *General Dentist*. May-Jun. 1988, v.36, no. 3, 227-9.
6. Clarno, J.C. "The impaired dentist. Recognition and treatment of the alcoholic..." *Dental Clinics of North America*. Oct. 1986, v.30, no. 4 (Suppl), pp. S45-53.
7. "I'm a dentist and a drug addict." *Missouri Dental Journal*. Jul-Aug 1990, v.70, no. 4, pp. 16-19.
8. Kenny, G.D. "Dedicated to the young, bright and aspiring." *Ohio Dental Journal*. Fall 1988, v.62, no. 10, pp. 32-4.
9. Kloeffer, G.D. "Dentistry's conspiracy of silence." *CDA Journal*. Feb 1986, v.14, no. 2, pp. 28-31.
10. Krzyzak, D.A. "You need not be alone anymore." *CDS Review*. Mar. 1989, v.82, no. 2, pp. 32-7.
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15. Oberg, S.W. "Chemical dependency. There are 18,000 dentists who need our special attention (Part II)." *Journal of the American College of Dentists*. Fall 1989, v.56, no. 3, pp. 10-3.
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17. Peters, A.C. "Chemical dependency: an overview." *California Dental Association Journal*. Feb 1990, v.18, no. 2, pp. 19-24.
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19. Peterson, R.L. "The impaired dentist: what Michigan dentists report." *Journal of the Michigan Dental Association*. Apr-May 1987, v.69, no. 4-5, pp. 203-12.
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22. Sandoval, V.A. "A perspective on chemical dependency in the health professions." *New Mexico Dental*

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- Muterthies, Klaus. *Esthetic approach to metal ceramic restoration for the mandibular anterior region*. Chicago: Quintessence, 1990.
- Pederson, Gordon W. *Oral Surgery*. Philadelphia: Saunders, 1988.
- Rose, Louis F.; Kaye Donald. *Internal medicine for dentistry*. — 2nd ed. — St. Louis; Toronto: Mosby, 1990.
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Prosthetics for the edentulous patient — 2 hour video — Core-Vent Corporation, 1989.



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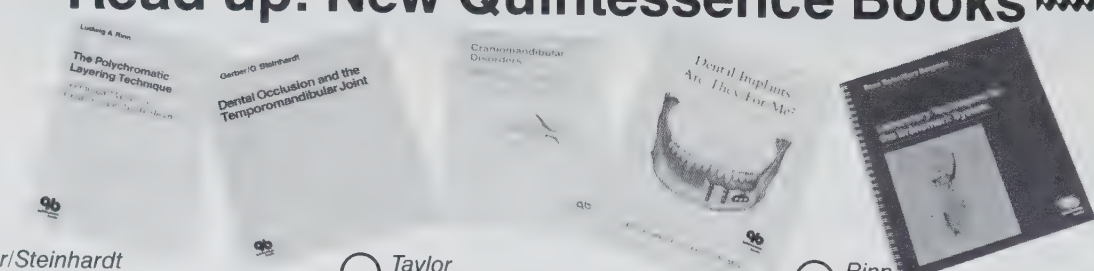
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The DAP Advisor offers information, ideas and advice to improve dentist/patient communication, raise awareness about good dental health, and help your practice become busier.

Mature Patients Over 5 Million Strong and Growing

In 1989, there were 5,327,300 Canadians over the age of 55. This group is the fastest growing sector of the Canadian population and constitutes over 20% of the country's total population. When you consider that these numbers don't take into account the huge baby boom population — the first generation of which will be 50 years old in 1996 — you get some idea of the size of the mature dental market and the direct implications for your practice.

A substantial percentage of today's mature population have all or some of their own teeth. According to the 1988 CDA-commissioned Gallup Poll: 13.6% of all Canadians aged 50 plus have all their own teeth; 21.8% are missing some teeth but have no dentures; 26.2% have partial dentures; and only 38.5% have full dentures.

Meeting the needs of mature patients is not difficult. In fact, it is really just a matter of respecting them as individuals and demonstrating how much you value them as patients and share their concern about their dental health. It is a case of little things meaning a lot. Remember, additional effort takes little time and energy, but is very significant in terms of how good it can make the mature patient feel about you and your practice. A satisfied patient is likely to return.

Here are a few little tips that will help you and your dental team demonstrate your concern about your mature patients' good dental health, and help make their dental visit a more pleasant and satisfying experience for all.

- **KNOW YOUR PATIENTS.** Some older people grew up at a time when good health and good dental practices were not really emphasized. While 61% of mature Canadians with their own teeth are concerned about the condition of their teeth, many are somewhat fatalistic about losing their teeth, and actually see tooth loss as a natural and inevitable consequence of ageing. In fact, the Gallup survey reveals that, although 35.4% of those over 50 currently have all or most of their own teeth and do not have dentures, only 26% expect to be that way in 10 years, and only 18% expect to be without dentures in 20 years. This means that you and your dental team will have to make an extra effort to convey the preventive dental health message to mature patients. They must be reminded that their own actions — including brushing, flossing, and visiting the dentist regularly — can help them keep their teeth good for life.
- **Consider and attend to their special needs.** Mature patients have the same basic needs as all other patients; however, some mature patients have additional special needs. As long as you and your team are aware of these needs, you can take steps to address them. For example:
 - If you or someone on your dental team suspects that a patient is hard of hearing, bring it to your team's attention. The team can then make an effort to face the patient while speaking, and speak in a *slightly* louder voice. Remember: slightly louder, not intrusive. You might even want to note the hearing loss on the patient's chart so that everyone will remember to speak up a little when the patient visits again.
 - Some mature patients may have difficulty filling out dental forms. If the receptionist sees that a patient is having a hard time reading, understanding, or completing a dental form, she should offer tactful assistance.
 - Patients with arthritis and other joint conditions often find it difficult to manipulate standard dental implements like a toothbrush. In these cases, you might want to recommend alternative implements and techniques, such as electric toothbrushes and prescriptive rinses.
 - Make sure that the lettering on signs in your office is large enough for most patients to read.
 - If there are stairs leading to your office, ensure that someone on your dental team is available, if necessary, to assist a patient in negotiating the stairs. The same is true for stairs leading to the washroom.
- **Take your time.** Sometimes it takes a little longer to consider and address the needs of mature patients. For instance, some mature patients may require extra reassurance and explanation about dental procedures. By taking the time to explain things to them — and taking time to listen to their feelings and concerns — you can help allay their fears and ease them through treatment. In so doing, you can make them feel good about having you for a dentist. And if they are satisfied with their dental visit, they will be more likely to keep coming back, and more inclined to pass on the good word about your practice to friends and family.

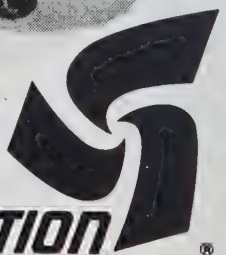


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DON'T JUST THINK ABOUT IT
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THE AWAY.

PARTICIPACTION 



“Something Resembling An Error...”

Reference: CDA Journal, June 1990, Vol. 56, No. 6; p. 471. Your Erratum indicates that you had [sic] an “intended misspelling error resemble”. It seems to me that this could have been an intended *spelling* error, or an intended *misspelling*, but not both, because an error in *intended misspelling* could only produce a word that would be correctly spelled, and, therefore resemble would be correct.

Please don't not misunderstand my comments.....

Bruce L. Bowden, BSc, DDS.
St. John's, Newfoundland

Dear Dr. Bowden,

Your closely argued point regarding the phrase “intended misspelling error” proves to be specious. In this case, “misspelling” modifies “error” and is not part of what is known as a noun phrase, as for example, “spelling error”. Both “intended” and “misspelling” modify “error”, describing, in fact, the kind or type of error, not its nature. One of the reasons for the confusion is that “spelling” does not change its form (prefixes and suffixes excepted) when used as a qualifier.

Many words exhibit this peculiarity. Word forms are based largely on convention and, at times a rather dated euphonics. Language, for its part, registers in a psycho-social discourse that defies facile or reductive categorization.

A further point: an “intended misspelling” would surely not produce a word correctly spelled, but rather a word intentionally misspelled. Here “misspelling” is used as a noun, not a qualifier. “An error in intended misspelling” (which is what you should

have underscored), may indeed produce a correctly spelled word; it may also, however, produce a neologism or a contextual error—or any number of similar permutations. The logic of language remains undelimited by strictly linear thinking.

Notwithstanding all the above—WE GIVE! Our phraseology exhibited redundancy and ambiguity—in fact, was egregious. We stand corrected, unaggrieved, and have received your painstaking correction in the spirit in which it was offered.

Till next time...

What's 'What'!

Re: Editorial, Journal, July 1990

I would have written “What haven't helped are...” [Also] I think W.G. Beers misspelled “pedlar”.

Dr. J.J. Mitchinson,
Niagara Falls, Ontario

Dear Dr. Mitchinson,

“What” is known as a “dummy” subject and is often used with the singular. “Pedlar” is one of the original spellings of the word and is now considered an archaism. Spelling, however, must remain as is or “sic” in a quotation.

Elderly Oral Premedication

Dr. Doug Galan presents an interesting paper on endodontic treatment of the elderly patient in the June issue of the Canadian Dental Association Journal (Vol.56 No.6). It is pleasing to see that informative articles are being published on dental management and treatment of the elderly. Equally pleasing is seeing the need for special stress management in this patient group mentioned. I would like to take this opportunity to add to Dr. Galan's section regarding oral premedication and the elderly.

Dr. Galan correctly points out that lorazepam has a shorter half-life than diazepam (10-20 hours vs. 20-100 hours respectively). This is in part due to lorazepam's slightly higher rate of clearance and smaller volume of distribution.^{1,2} In addition, the major metabolites of diazepam are pharmacologically active. Age has a significant effect on diazepam pharmacokinetics, whereas lorazepam

disposition is only minimally affected by age.² This may be the result of age-related changes to phase 1 reactions associated with diazepam metabolism.

An ideal oral premedicant for dentistry would have a very short half-life—1-to-3-hours—to provide anxiolysis and sedation for the duration of the dental procedure. Though lorazepam is a better choice than diazepam in this regard, it appears as though triazolam, with a half-life of 2-3 hours, would be better suited. An excellent review on the use of triazolam in dentistry is presented by Young and Mason in the Canadian Dental Association Journal (July 1988 Vol.54 No.7). Triazolam is a newer benzodiazepine with hypnotic, sedative, amnesic, anticonvulsant and muscle relaxant properties. The recommended dosage of triazolam for a healthy 70 kg male is 0.25 mg to 0.50 mg. A reduced dose of 0.125 mg to 0.25 mg should be used in the geriatric patient.³

At present, triazolam appears to be the ideal agent for oral sedation of the adult dental outpatient.

Michael Saso, DDS, Dip Anaes.
Ottawa

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Positive Repercussions?

I write to congratulate both the Editor for his May Editorial and CDA President, Kevin Roach, for his May Column.

You hit on matters of serious professional and ethical concern to many of us, and both addressed the subjects most capably.

It takes courage to say these things, and I trust that the repercussions are positive.

David K. Peters, DDS
Newfoundland

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Dental Students' Forum

A Youthful Perspective on Research

by Kerim M. Özcan

"The process of scientific discovery, is in effect a continuous flight from wonder."

—Albert Einstein

Growing up amid the splendor and wonder of the world around them, young minds have always been mesmerized by things new and exciting. Whether discovering new treasures in the form of an old house or within the texts of Dickens or Tolkien, a child's mind is constantly nourished by the wonders of the world. As children grow up and everyday life takes over with its mundane routines, imagination is allowed to settle in the corners of one's mind, waiting for the opportunity to be indulged once again.

This opportunity, for some, comes in the form of a university education. Once again, an environment of learning and discovery is found. These wonders, however, are different from before, for now discovery is no longer of things forgotten and old; discovery is truly of the hidden and unknown.

Research is this never-ending search for the hidden and yet to be discovered. As an individual pursues an academic career in the form of a baccalaureate degree, students often gain their initial contact with the formulation of new ideas in the form of an undergraduate thesis or research project. It goes without saying, for the most part, that no new earth-shattering revelations are made with such works; but if one examines the true purpose of such academic pursuits, there is success. This success is reflected in the spark of intellectual curiosity which accompanies it.

When a baccalaureate degree is bestowed upon a worthy recipient, many paths may be taken. Some individuals decide to wander among the realms of the work force, while others choose a path towards the fulfillment of requirements for a dental or medical degree.



Kerim M. Özcan

About the Author

Kerim M. Özcan, a native of New Brunswick, graduated from Dalhousie University in 1987 with Honours in Physiology. Presently a fourth year dental student at Dalhousie University. Mr Özcan has been actively involved in research for the past four years, and has presented papers both nationally and internationally. Recently, he was awarded the 1990 IADR David B. Scott Student Scholarship for his efforts in polymer-drug interaction research. Mr. Özcan also currently holds the position of Student Governor for the Canadian Dental Association.

Within the profession of dentistry, many routes of academic interest are available for a young (or not so young) mind. Opportunities in the areas of clinical and theoretical dentistry are bountiful and for the lucky student, a true intellectual challenge may present itself in the form of research.

Research, for the curious few, lends itself to a multitude of opportunities and experiences. It is a common misperception that a researcher is an exceptionally brilliant person who

dreads sports and physical contact and hides in the basement of a research facility, save the occasional trips to the donut shop. On the contrary, the majority of research work is carried out by a multitude of people who have a lot of inner drive and perseverance with slightly above-average intelligence. As Sir Frederick Banting so elegantly said, "Many people think that research is a supernatural gift of the gods. However, it is simply an idea from the troubled mind, an inspiration followed by infinitely painstaking work and perspiration."

It becomes more and more apparent as the twenty-first century approaches that the world of academia and research is changing. As funding becomes more restricted from both government and the private sector, research and educational institutions are finding it increasingly difficult to retain or develop critical units of researchers within their respective organizations. Research groups have been placed in the unfortunate and difficult position of having to produce data in a relatively short period of time that is both of high academic calibre and of practical value. To some this may seem fine, but the true researcher knows that the greatest leaps are made with very small steps.

This search for excellence has also extended into the hiring practices of some academic institutions. Increasingly there are trends which indicate that the most marketable individuals for academic centers in the coming decade will be those carrying a DDS/DMD or M.D. with a Ph.D. combination. Academic institutions, especially in the field of dentistry, have realized that research is a very integral part of the learning environment. To some degree, in the past, research was left to nurture itself in the minds of a dedicated few. This has left a deficiency in certain programs. Dr. James Bowden said, "If dentistry wishes to pursue its status as a learned profession, it must sustain a vigorous research component of such

quality that it enlarges our ability to prevent and treat dental disease."

Bowden continued to say, "There is an acute deficiency in the number of clinical dental faculty who are adequately trained to do high quality research." This deficiency has been recognized and policies have been adopted to correct this. Such policies have included some extra funding, but for the most part, it has been earmarked for developing skilled and qualified faculty members. This has made competition for faculty positions very intense; individuals who hope to occupy such positions in the future and do not possess both a DDS/DMD and Ph.D. should seriously consider obtaining the complementary degrees.

Students are the fundamental working unit of the academic framework, for when there are no more students of any age, all learning will have ceased. What is the role of undergraduate students in the dental research community? Some individuals believe that students do not have any part in this elitist club. This author begs to differ, for if young minds are not captured in the very first stages of their development, then the road later on in this direction becomes very difficult. The dental schools of today must encourage the eager young mind to be ever inquisitive and nurture this enthusiasm. This does not imply that every student will become a Nobel Laureate, but if the interest is found within the spirit of a young mind, then it should be stimulated. I strongly believe that the future of dental research is its youth. Dr. James Winby, a biology researcher, has said that, "Research represents the roots of the tree of knowledge." Dr. Derek Jones, Assistant Dean of Research at Dalhousie University, wrote in the *CDA Journal* (1986), "If dentistry is to harvest some of the fruits of knowledge we had better sow some seeds quickly." I believe Dr. Jones meant sowing seeds in the minds of motivated students, for he certainly recognizes the need to harness the energy of a youthful mind.

Larkin Kerwin, President of the National Research Council, summed up the academic situation by stating that, "University graduates should be distinguished by an understanding of research and thus be psychologically prepared for change." How true this is for our future dental graduates! Kerwin further stated, "If university graduates have any distinguishing marks, it

should be that they have spent some time in the presence of research."

Kerwin concluded, stating, "Take away research and you have an institution duplicating things that are all done elsewhere. Keep only research and you have a university still."

Opportunities for research within the faculties of dentistry are becoming more numerous for students. Funding for such programs is available through summer studentships and MRC fellowships, and these have provided some excellent experiences for fortunate participants in the field of dental research. This author strongly feels that it is truly unfortunate that not all applicants for summer research programs are successful. This is mainly attributed to lack of funding and not lack of projects or interest. At Dalhousie University, 33 students applied for research positions for the summer of 1990. Of these, only 17 students were granted summer studentships. It is unfortunate that not all applicants could receive some sort of exposure to research when they are willing and able to give their time and energy. In the spring of 1990, the Faculty of Dentistry at Dalhousie University presented 32 papers at the IADR conference in Cincinnati, Ohio. What is most encouraging is that eight of these research papers were presented by students based upon their participation in summer research projects. I feel that the opportunity to present work at an international meeting is a fantastic way to kindle curiosity in students, and should be encouraged.

In addition to international meetings, *Procter and Gamble*, in conjunction

with the American Dental Association and various individual dental schools in the United States and Canada, sponsor a student meeting annually in the United States to promote student interest in research. Students from Dalhousie University who have been fortunate enough to attend have remarked that it was a very worthwhile and rewarding experience.

I believe that more institutions should set aside additional funding for supporting and encouraging student research. Canadian dentistry should consider such funding an investment in the future, for the future lies with its youth.

In closing, I would like to encourage the researchers and educators of today to think of the world of tomorrow. If our teachers do not take their pupils by the hand and lead them in their first few steps into the field of research, it will be so much more difficult to achieve success. I would like to conclude with a quotation from one of the most prominent physicists of our time.

"Humanity's deepest desire for knowledge is justification enough for our continuing quest. And our goal is nothing less than a complete description of the universe we live in."

—Stephen Hawking

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Russian Dentistry Comes To Kenora

by Les Armstrong, DDS,DDPH

INTRODUCTION

A trip to another country can sometimes result in time travel of a sort. Antiquated equipment, poor working conditions, and a lack of supplies—all these were features of the Russian dentistry scene. Les Armstrong's comments throughout this travel essay on the state of dental practice in Russia suggest that change and improvement is desirable—even crucial—if the oral health of the Russian people is to be upgraded.

Dr. Armstrong orchestrated some meaningful change of his own by asking Dr. Holmes of Kenora, Ontario, to treat Lena, the young Russian guide who accompanied Dr. Armstrong and his medical colleagues throughout their tour. As Dr. Armstrong reports, Lena's farewell handsfree smile was a genuine "perestroika" gesture.

My trip to Russia began October 10th, 1989, leaving from Toronto via Finair to Helsinki. I was the only dentist amongst 17 hockey-playing physicians who had organized this 10-day medical (hockey) tour of Finland-Russia.

We spent three days in Helsinki, playing hockey in the evenings and sightseeing during the day. Finland is very modern and prosperous; most people understand English and many speak it fluently. Remarkably, a pint of beer cost 30 Finmark or \$10 CDN. No one offered to buy the round.

We left Finland October 13th, again travelling on Finair to Leningrad. Before leaving we stocked up on bottled water and snack foods as we were told the drinking water was often contaminated and the food was not great. Those with plans to do some minor trading on the black market bought cartons of Marlboro cigarettes. This was a good move, we discovered shortly after arriving in Leningrad. It seems everyone in Russia smokes and Marlboros are prized over their foul smelling local brands. Russia truly is Marlboro Country.



Dr. Les Armstrong, Fort Francis, Ontario, is introduced to Moscow's "Free Market".

Our first impression of Russia was the Leningrad airport, which is drab and shabby, with no one asking to carry your bags. The security check was somewhat intimidating as it involved being locked in a cubicle while a stony-faced lady scrutinized your passport picture to see if it was really one of you.

During the bus ride to the hotel, our attractive young intourist guide introduced herself in perfect English with no Russian accent. In fact, she sounded more like someone from London, England. One of the things she cautioned us not to do was buy rubles on the black market as this was a serious offence which could result in imprisonment. No sooner had we got into the hotel than we were openly offered rubles, 10 for 1, by the hotel porter. (Ten rubles for \$1.00 US as opposed to the official Russian rate of one ruble for \$1.65 US. Needless to say, most people bought black market rubles. The ruble, however, is of limited value, as most people, including hotel shopkeepers and street vendors, will take only hard currency. Russian citizens are forbidden to possess foreign currency, and are therefore very

cautious about transactions involving dollars.

The Russian economy is in serious trouble. Basics such as bread and meat are in short supply with such things as fresh fruit and vegetables simply not available. Long lineups were everywhere.

The food served in our hotel was passable. However, there was seldom any choice. You either liked what they served or you did without. During my time in Russia, I did not see milk or juice of any kind. I never thought I would see myself drinking Pepsi for breakfast, lunch and dinner—but I did and was glad to have it.

If you can ignore the sad plight of the people, Leningrad is a beautiful city to visit with the Summer and Winter Palaces and the Hermitage Museum, to name but a few of the noteworthy sites. Since I'm not much of a tourist, I chose to leave the main tour group so that I could spend an afternoon visiting a dental clinic. This had been arranged the night before through the dentist-wife of one of our hockey opponents, whose team of ex-nationals had just smoked us 99 - 0.

The clinic, which was located on the second floor of an older building, consisted of a number of cubicles similar to those I remember during my years in the army in the early 60's. The equipment appeared to be circa 1950 with belt-driven handpieces and upright chairs. This particular clinic was part of a training school. It was fascinating to watch a number of young ladies in long white dresses and aprons standing around a chair while an instructor demonstrated a procedure. I had the strange sensation of being transported back in time.

The dental profession in Russia suffers badly from isolation and underfunding. Local anaesthetic and needles are in short supply, hence few people are given injections other than for extractions. Rubber gloves are not available and sterilization of instruments is done by boiling. The one sink was located at the far end of the clinic. The dental materials I did see were contained in small brown bottles — prepackaging is non-existent. Before I left the clinic, I was given a wish list of supplies which included burs, cements, anaesthetic and white filling material — an obvious lack in the Soviet Union. (An attractive young lady, from whom I purchased a painting on the street, had all her anterior teeth capped with stainless steel crowns.)

My next experience with Soviet dentistry occurred in Riga, Latvia, which we visited after Leningrad. The wife of one of the physicians had the misfortune to fracture a cusp on a lower molar and it was lacerating her tongue. However, my tales of Soviet dentistry had so frightened her that she refused to seek out a local dentist. It was arranged that I would do her treatment in one of their clinics. The clinic was surprisingly similar to the one in Leningrad, if somewhat better equipped — it had an antiquated x-ray unit. Fortunately, all I had to do was smooth the sharp edge. Using a belt-driven handpiece brought back memories of my years of dental school in the late 50's at the University of Alberta.

The second part of my story involving dentistry has to do with our Russian intourist guide, Lena Profatilova, who, by the time we reached Moscow, was one of us, including a very passable Canadian "eh" at the end of her sentences. We had convinced her that she should come to Canada, and with the generous



Dr. Armstrong treats a Canadian tourist in a Latvian dental clinic during a stopover in Riga.



Lena, a Russian Intourist guide, meets Dr. Bradley Holmes and dental assistant Sandy Burchell in Kenora, Ontario, office.



Lena's Russian dentistry is replaced "the Canadian way".



tip of \$1,000.00 US (100 times her monthly salary), she would be able to afford the airfare, with money to spare. One of the physicians would be her host as required by the Department of Immigration and she would come to Canada in April 1990 for one month.

It was obvious that she needed serious dental work. Every time she laughed she held her hand over her face to cover her teeth. As the only dentist on the tour, I was given the responsibility of restoring her teeth during her stay in Canada. Since I am mainly a dry-fingered public health dentist, I decided to ask a colleague, Dr. Brad Holmes of Kenora, Ontario, to treat Lena. Without a moment's hesitation, Brad agreed, even though she would be visiting during one of his busiest months of the year. For the first three weeks, Lena stayed with her host in Niagara Falls. In order to allow Brad to plan Lena's appointment time, I asked a classmate, Dr. Matt Taylor of St. Catharines to take x-rays, models, and chart Lena.

During her first appointment, which occurred on a Sunday afternoon and lasted four hours, Lena had two full quadrants restored for a total of 19 surfaces. Before her treatment was



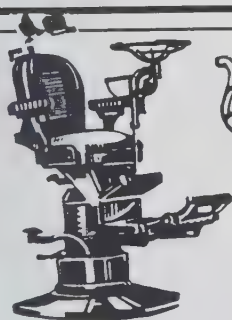
All Smiles! (l. to r.), Dr. Holmes, Lena, Sandy Burchell, Dr. Armstrong – "Dental Health, Good for Life".

completed, Lena would have new restorations in most of her teeth with a porcelain-metal bridge placed from her upper left cuspid to her first molar, replacing her missing first and second premolars.

While Lena appeared weary at the end of her long appointments, she never complained. It was clear that she

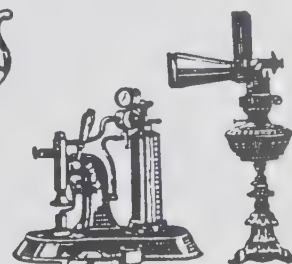
was grateful to be receiving treatment that would only have been a dream for her in Russia.

The proof that Lena's treatment had been successful was evident on the day she left Kenora to return to her home in the Soviet Union. As she waved goodbye, Lena smiled – with no hand covering her face. △



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Donations of museum quality dental artifacts would be much appreciated. Particularly requested are larger items such as dental chairs, units, cabinets and X-Ray machines.

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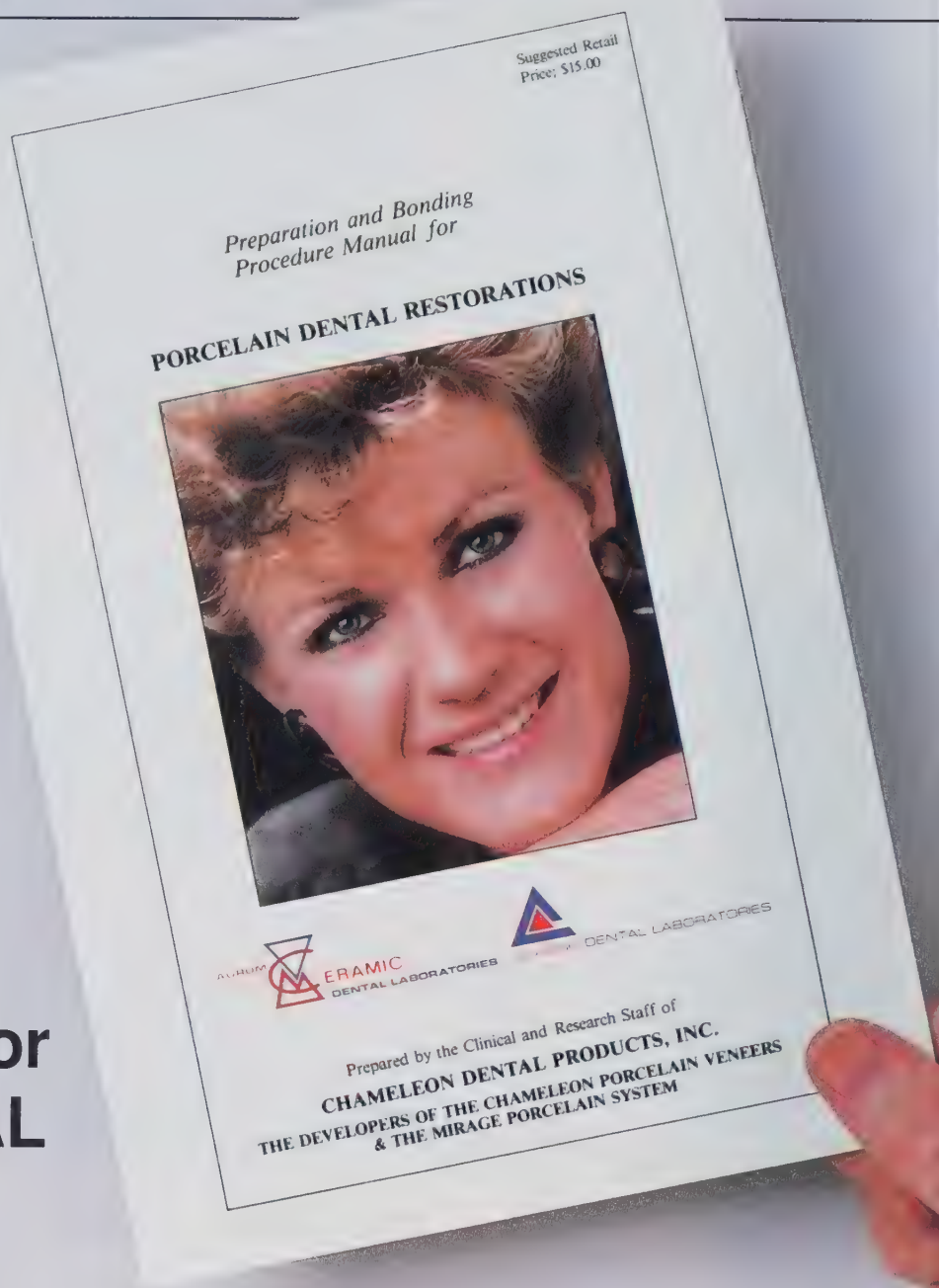
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Oral Cancer and Precancer

*E. Peters DDS, MSc, FRCD(C).
W.T. McGaw DDS, MSc, FRCD(C)
Department of Oral Biology
Faculty of Dentistry
University of Alberta
Edmonton, Alberta*

Oral cancer accounts for 3-5 per cent of all malignancies in North America; squamous cell carcinoma (SCC) comprises about 91 per cent of this total, representing the predominant oral cancer risk.¹ Patients diagnosed with early precancerous lesions or superficially invasive SCCs have an excellent prognosis. In contrast, patients with advanced disease have a poor prognosis and suffer comparatively marked morbidity from both the tumour and its treatment.² Thus, the emphasis in management of oral SCC must be on early recognition and treatment. This article is intended to provide a clinical overview of oral SCC, the premalignant counterparts and the predisposing conditions.

Epidemiology

The risk of oral SCC increases with age. In North America, approximately 95 per cent of cases occur in patients over 40 years of age with a mean age at diagnosis of 60 years and a male predilection of 2:1. This male predilection has decreased from the 6:1 ratio noted in 1950, presumably because of the increasing acquisition by women of predisposing habits such as alcohol or tobacco use.¹

Although SCC can occur in all oral sites, the lower lip, latero-ventral aspects of tongue, floor of mouth and the oropharynx are at greatest risk. It should be emphasized, this profile is that found in Western countries. In India, oropharyngeal SCCs represent about 40 per cent of all cancers with a high incidence of buccal mucosal lesions associated with pan chewing and in some-areas, a high incidence of palatal SCC associated with the practice of reverse smoking.³

Clinical Presentation of Oral Precancer and Cancer

Precancerous lesions have been defined by the World Health Organization (WHO) as "morphologically altered tissue in which cancer is more likely to

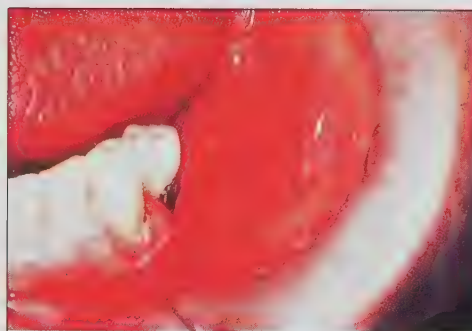


Figure 1: Carcinoma-in-situ presenting as erythroplakia on mandibular edentulous ridge. (Courtesy of Dr J. H.P. Main)

occur". The WHO has separated this from premalignant conditions which refer to generalized states with increased cancer risk. Examples of premalignant conditions, some controversial, include sideropenic dysphagia, submucous fibrosis, syphilis, lichen planus, discoid lupus erythematosus and xeroderma pigmentosum.⁴ The premalignant conditions are discussed in the next section with other predisposing factors.

Essentially, there are two precancerous lesions in the mouth,² leukoplakia and erythroplakia, referring to white and red mucosal patches respectively, which cannot be diagnosed as any other specific pathologic condition. Erythroplakias (Fig. 1) usually show malignancy or premalignant changes on biopsy; leukoplakias (Fig. 2) have a more variable profile and malignancy or premalignant change has been found in 10 per cent to 34 per cent of cases.⁵ Erythroleukoplakia (Fig. 3) refers to combinations of these presentations.

The most common presenting signs of oral SCC parallel those of the precancerous lesions. In addition to leukoplakia, erythroplakia or combination of these features, SCC may present as a ulcer (Fig. 4) or an exophytic lesion (Fig. 5) with or without induration and fixation to deeper structures. Failure of the lesions to resolve is an additional significant clinical feature. In advanced lesions, regional spread may lead to cervical lymphadenopathy.

In contrast to conventional SCC, a less aggressive mucosal epithelial



Figure 2: Squamous cell carcinoma presenting as leukoplakia on ventrolateral border of tongue. (Courtesy of Dr J.H.P. Main)



Figure 3: Squamous cell carcinoma presenting as nodular erythroleukoplakia on buccal mucosa.



Figure 4: Squamous cell carcinoma presenting as chronic ulcer with indurated margin on ventrolateral border of tongue. (Courtesy of Dr J.H.P. Main)

malignancy, the verrucous carcinoma, presents as a wart-like or cauliflower lesion (Fig. 6). These lesions can be locally destructive but rarely metastasize and usually have an excellent prognosis with complete excision.⁶ The verrucous carcinoma has

Keywords: Oral squamous cell carcinoma
Running title: Oral squamous cell carcinoma

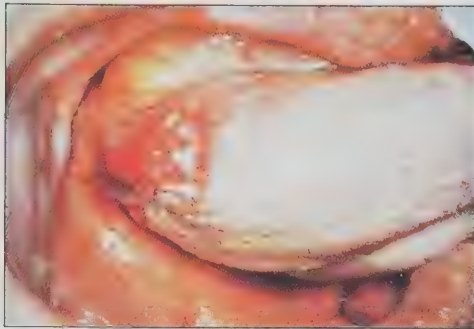


Figure 5: Squamous cell carcinoma presenting as indurated exophytic lesion on lateral border of tongue.

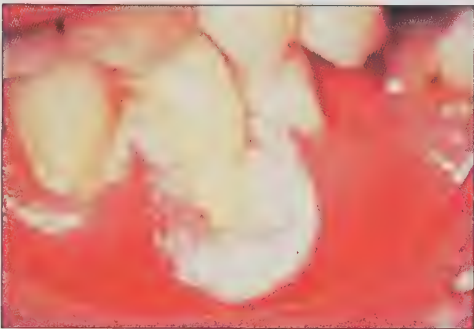


Figure 6: Verrucous carcinoma arising on mandibular gingiva.

been associated with a clinically similar but histologically distinguishable precursor lesion called verrucous hyperplasia. Verrucous hyperplasia can precede the development of verrucous carcinoma or less commonly, SCC.⁷ A second term which refers to the same category of precursor lesion is proliferative verrucous leukoplakia.⁵

Predisposing Factors

A variety of carcinogenic factors can interact in poorly defined ways over variable periods of time. Some of these factors, such as alcohol or tobacco use, have been clearly implicated; others such as erosive lichen planus or candidal infection, remain controversial. Syphilis is of waning importance where as others, such as HIV infection, are of increasing importance.

Tobacco:

Tobacco in all forms can predispose to oral SCC. Smoking tobacco in cigarettes, pipes, and cigars have all been implicated.^{5,8} A single retrospective study of 945 afflicted patients found that only 3.4 per cent had never used tobacco.⁹ Even marijuana smoke has been associated with upper aerodigestive cancers in a relatively young series of patients (mean age, 27 years).¹⁰

Topical application of tobacco products occurs in tobacco chewers and snuff dippers. Snuff is placed in the oral vestibule for variable lengths of time and a clinically suggestive white lesion ("snuff dippers keratosis"),



Figure 7: Actinic cheilitis of the lower lip.

considered potentially premalignant may be found at the favoured site. The malignancy most frequently associated with topically applied tobacco products is verrucous carcinoma although SCC can also occur.^{4,6} The related practice of chewing pan (a variable mixture including tobacco, betel nuts and slaked lime), widely practised in south-east Asia, also predisposes to oral cancer.

Oral submucous fibrosis

This is a poorly understood disease, probably related at least partially to pan chewing. A genetic predisposition may be important. Other possible etiologic factors which have been suggested include eating chili, an irritant spice, and nutritional deficiencies. The disease occurs primarily although not exclusively in East Indians. Initially there may be mucositis with vesicle formation or ulceration and a burning sensation. In the later stages there is stiffening of the oral mucosa as a result of subepithelial fibroplasia, sometimes to the point of trismus. SCC can develop in the atrophic epithelium of the affected mucosa.

Alcohol:

Alcohol and tobacco are often used together and appear to interact synergistically in carcinogenesis. However, alcohol use by itself has also been associated with an increased risk. It is possible that contaminants or alcohol congeners within alcoholic beverages, rather than the ethanol itself, are the important factors.¹¹

Sunlight:

Sunlight is an important aetiological factor in SCC of the lower lip. Actinic cheilitis, a premalignant lesion, produces characteristic lip changes consisting of hyperkeratosis and erythema, loss of sharp demarcation between the vermillion and the skin and a slight persistent swelling of the tissues just below the vermillion. (Fig. 7)

Viruses:

Evidence showing a high prevalence of Herpes Simplex virus Type-1 or some Human Papilloma virus subtypes has been presented in cases of oral pre-

cancer and cancer. Whether these can be regarded as etiologic agents is uncertain. An increased incidence of oral cancer in patients infected with Human Immunodeficiency Virus (HIV-1) infection has been reported.⁻¹²

Candidiasis:

Candidal yeasts are often found in erythroleukoplakias and treatment of these lesions with antifungal therapy can result in transition of such lesions to a homogenous leukoplakia which is thought to represent a lower risk for cancer. Whether a causal role in malignant transformation can be ascribed to candida or whether the fungus is merely a secondary invader in an environment predisposed to infection as a result of pre-neoplastic changes has not been resolved.¹³

Lichen planus:

Malignant transformation has been reported in a small proportion of lichen planus (LP) cases, erosive LP having been particularly implicated.⁸ However, although these claims have not been rejected, they have been challenged because of inadequate documentation or the inclusion of cases with concomitant confounding risk factors.¹⁴ The controversy is due, at least in part, to the difficulty in identifying LP unequivocally. LP can have a heterogeneous clinical presentation ranging from erythematous and ulcerated lesions to reticular and plaque-like lesions. Furthermore, several aetiologically distinctive conditions ranging from drug reactions to reactions to metallically dissimilar adjacent fillings can produce histopathologically similar "lichenoid" reactions.

Sideropenic dysphagia (Plummer-Vinson or Patterson-Kelly syndrome):

This syndrome, usually found in middle aged women, consists of dysphagia, upper esophageal webs, iron deficiency anemia and hypochlorhydria. The atrophic mucosa of the upper aerodigestive tract in this condition shows increased malignant change.

Discoid lupus erythematosus (DLE):

Long-standing cases of DLE occasionally undergo malignant transformation. A case report and review of 15 further cases by Handlers et al¹⁵ showed seven of these cases occurred in the lips, suggesting a possible further association with actinic damage.

Syphilis:

Historically, tertiary syphilis has been

associated with leukoplakia and SSC of the tongue although the arsenic, used in the past as a treatment of syphilis, might have been the causative factor. Presently, syphilis as a predisposing factor to SCC is not a significant concern.

Other Factors:

Unusual hereditary conditions, such as xeroderma pigmentosum or dyskeratosis congenita, which are defined by various distinctive stigmata are also often associated with oral SCCs.

Local irritation has also been associated with oral SCC; however the significance of this is difficult to document because of the frequency with which such irritation occurs and this factor may have been over emphasized in the past.

SUMMARY

Oral carcinoma can be regarded as a largely preventable disease. Early recognition should be an attainable goal for most patients undergoing regular dental recall appointments. An understanding of the risk factors and of the characteristics of precancerous lesions can serve to heighten clinical sensitivity to oral SCC. Biopsies should be performed in all cases where the possibility of SCC exists; alternatively, patients should be referred to appropriate specialists for further evaluation. △

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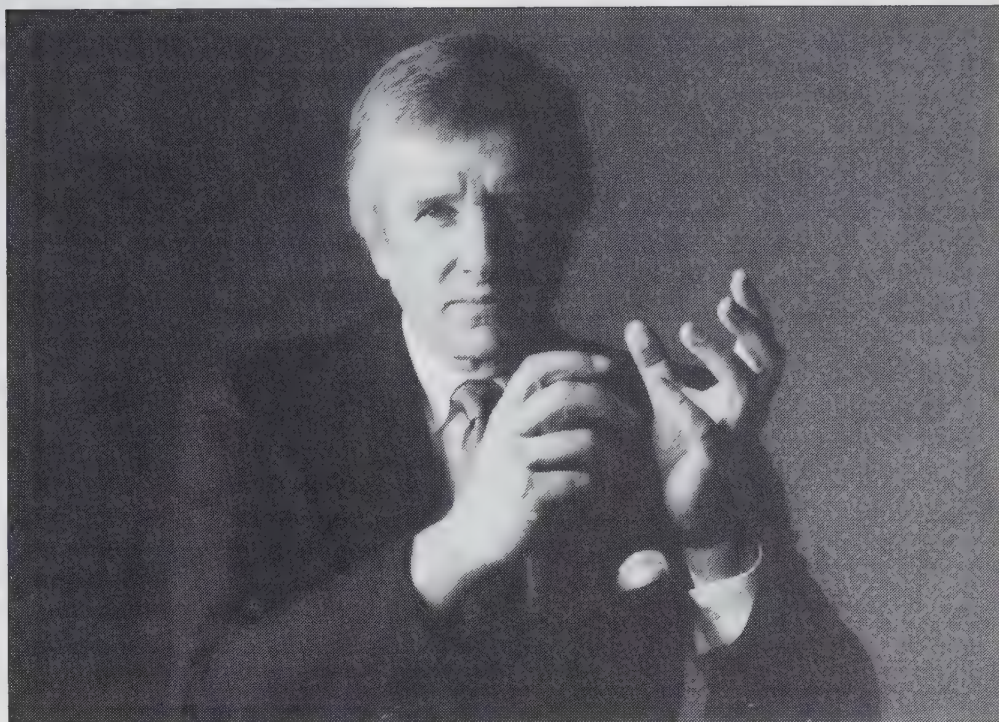
by P. Ralph Crawford, BA, DMD.

“An educational and emotional experience”. This was the expression heard from many of the several hundred dentists and auxiliaries who spent two lecture days with “The Man from Cox”, Wilson Southam. Time spent with Southam is not just a glimpse into the future, nor merely an insight into the meaning of life itself, but it is an excellent opportunity to observe, firsthand, a very interesting human being — Wilson himself.

Casually attired, Southam's lecture style is suffused with a humble, gentle confidence uncharacteristic of a person who has delivered over 800 presentations around the world — nor of an individual whose personal fortune is probably worth millions; nor of one who can request and get \$5,000 a day.



Southam's casual attire belies the powerful self-help message of his philosophy.



Calgary-born in 1932, Wilson was raised in a home that knew fame and riches, love and tragedy. He speaks openly about a turbulent family life. Both parents had alcohol problems; one committed suicide and the other eventually died from over-drinking. “But I was lucky”, he says, “I never doubted they loved me. I would sooner have that than a life that looked perfect on the outside but didn't have love.”

Wilson Southam has been a ski instructor, a mountain guide and a race car driver. In 1964, following an Oxford education, he entered journalism and television. He assisted in the design of the pioneering and innovative CBC program “This Hour Has Seven Days”. The career in television (and, it would seem, throughout his life) always poses the same question: “How do you help people change if they want to? Not that you have the answers, but how do you empower them to make the changes they want to make? What is in their best interest not mine, but theirs? How do you give them the tools to do what they want — to be more confident, more assertive and have

better self-esteem?”

His perception of change and what the individual does with it undoubtedly first brought Wilson to the doorstep of dentistry. As a director of a venture capital company, he was introduced to a young Hamilton, Ontario dentist, Dr. Donald Coburn. Dr. Coburn had reached a point where he could no longer comfortably stand at a dental “gas pump” unit. His fledgling company, Cox, was challenging generations of a “cuspidor calisthenics” practice setting. Coburn was a pioneer advocate for the sit-down-washed-field dental concept.

In the late 1960s and early 1970s, Southam and Coburn toured, lectured and demonstrated dental delivery modes across the country and around the world. Probably their greatest compliment came when major equipment manufacturers either copied what Cox was doing or went out of the equipment business. For Southam, however, after ten years of creating new systems, improved physical dental environments and enhanced

communication values, the observable changes were not enough.

The man appears obsessed with change — he abhors rigidity. Speaking passionately on “paradigms”, he cites examples where mindset has blinded opportunity. Swiss watch manufacturers saw no future in the quartz watch. They subsequently went from 92% to 10% in world watch production after the Japanese accepted the quartz challenge. Kodak, when offered the electrostatic process of copying (Xerox), turned it down because it didn’t look like a photograph and Kodak knew all about photographs. Likewise, Ritter, S.S. White and Weber eventually left the dental equipment manufacturing field after losing millions. “We have seen many changes”, says Southam, “But it’s not enough. By the year 2004, I want to be watching the front edge of dentistry prove to the rest of the world that there is a better model of health care based on the informed choices of consumers who make their own plans for their own health. That better model is not going to come from medicine”, he continues, “It is coming from the front edge of dentistry”. He cites the former United States Surgeon General, Dr. C. Everett Koop, who confirmed it is dentistry, not medicine, that has the true model to lead a world into wellness.

Today Wilson Southam heads *The Group at Cox Inc.*, a learning resource organization based in Stoney Creek, Ontario. Benefitting from 25 years of involvement in equipment design, health centre layouts, team-building, communication skills and strategic planning, the Cox Group now operate dental learning experiences in Canada, United States and Australia.

These days, Wilson Southam’s presentations stress the **Volitional Practice** — a methodology trademarked by *The Group at Cox*. Described as a philosophy, a model and a practical



Wilson Southam, right, speaks with admirer and *Journal* Editor, Ralph Crawford.

way of helping people in an age of elective dentistry, the **Volitional Practice** is based on choice. Its thesis states that most people — given an appropriate climate and effective counseling — will choose higher levels of self-care of their own volition.

Southam explains that the **Volitional Practice** exists when “something way inside yourself — a quiet voice — says “I want to find a way through this life that doesn’t make me use, control, direct or manipulate or sell other people. I want to be able to be the same congruent person living by my real values without affectation whether at work, play, love or worship”.

“The **Volitional Practice**”, he continues, “is a model of sharing based on a team of people loving what they are doing and truly proud of what they are doing to help people. The whole team collapses if you are just doing it for the bucks in your hand and excellence isn’t at the centre. You can’t get good people to sell junk. Team members have to be read by the public as being honest, straight and really comfortable in what they are saying and doing.”

Wilson Southam, in a two-day

presentation to a typical dental society, leads his audience through a self-help workbook, “*Helping People Create Plans For Their Own Health*.” The booklet deals graphically with such topics as Self-Limitation, Challenges, A Celebration, An Experience, Congruence and Spirit. The seminar day is interspersed with sessions of participatory groups intent on self-analysis.

Don’t for a moment believe that a two-day seminar with Wilson Southam is some esoteric trip of the metaphysical, bereft of practical benefit. Inherent within Southam’s **Volitional Practice** is a very successful—spiritual and financial—dental practice. His sincerity and enthusiasm exude credibility. He is believable when he outlines how an empowered dental office team—*really* intent on helping others, and equipped with an effective systems support — can enjoy an annual income of over a million dollars *without* raising fees.

Wilson Southam’s worthy vocation, and *The Group at Cox’s* goal, is to support people to effectively and ethically achieve enduring personal growth. △



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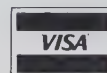
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Étude sur les causes d'échecs post-endodontiques: Une analyse descriptive d'une population de 198 cas de retraitements chirurgicaux

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RÉSUMÉ

Cet article rapporte une analyse statistique descriptive de 198 cas d'échecs post-endodontiques décelés en pratiques privées, pour lesquels une chirurgie apicale fut demandée. Les biopsies associées à ces dents montrent que 68,18 pour cent des lésions sont constituées de granulomes apicaux, 3,5 pour cent sont des kystes, 16,16 pour cent sont des granulomes épithélialisés et 12,12 pour cent sont des cas "autres". Les groupes de causes les plus fréquemment associés à ces échecs sont des erreurs techniques (55,05 pour cent des cas) et des erreurs procédurales (17,68 pour cent).

SUMMARY

In this article, a statistical analysis describes 198 cases of post-endodontic failures referred from private practitioners for surgical retreatments. Biopsies of these lesions showed that 68.18 per cent of them were identified as apical granulomas, 3.5 per cent as cysts, 16.16 per cent as epithelialized granulomas and 12.12 per cent as "other" cases. The two main groups of causes associated with these failures are: technical errors (55.05 per cent of the cases) and procedural mistakes (17.68 per cent).

La plupart des chercheurs en endodontie, comme le rapporte Grossman¹, s'entendent pour affirmer que le taux de succès prévisible, susceptible d'être atteint, à la suite de traitements de canaux conventionnels, se situe autour de 90 pour cent. Ingle² dans son étude à l'University of Washington rapporte un

taux de succès de près de 95 pour cent. Schilder, dans son enseignement à la Boston University, proclame que le taux de succès prévisible en endodontie est de 100 pour cent en autant que l'on puisse désinfecter totalement le système canalaire par une mise en forme adéquate et sceller les issues périradiculaires de ce système par une obturation étanche et stable.

Il arrive trop souvent, néanmoins, de découvrir chez de nombreux patients des dents inconfortables, des fistules chroniques, des radiotranslucidités apicales croissantes, sur des dents ayant déjà reçu des traitements endodontiques. Ces dents ont souvent des pivots, des couronnes ou des ponts qui les recouvrent et ne peuvent être récupérées que par l'approche chirurgicale.

La littérature scientifique associe plusieurs causes aux échecs post-endodontiques^{2,3,4,5,6,7}. Doit-on en faire porter le tort sur la nature kystique des lésions? Doit-on blâmer la décision initiale du praticien qui a accepté de traiter un cas compromis parodontalement ou un cas techniquement trop difficile à traiter? Doit-on dénoncer le manque d'auto-discipline de certains dentistes qui négligent de se plier à toutes les exigences de la pratique endodontique? Doit-on accuser le mauvais état de santé du patient?

Dans cette optique, il nous a semblé opportun de vérifier en quoi consistaient les causes apparentes d'échecs de quelque 198 cas de traitements conventionnels fautifs confiés à notre attention par des dentistes généralistes, pour retraitement chirurgical. Ces patients proviennent de cabinets privés multiples où les traitements infructueux furent identifiés. Le but de la présente étude est de présenter une analyse statistique descriptive des

dents retraitées, en établissant le diagnostic histologique des lésions qui y sont associées, puis en dressant un bilan des causes apparentes d'échecs qu'elles représentent.

Procédures et méthodes

Les dents faisant l'objet de cette étude représentent la totalité de divers cas traités chirurgicalement par l'auteur, sur une période de temps limitée et récente. Tous les cas possédant un rapport de biopsie furent retenus.

- Par l'effet du hasard, les patients des deux sexes sont représentés en nombre égal. Ils sont âgés de 12 à 75 ans; ils ont été classés en sept catégories:
1 – Les moins de 19 ans; 2 – Les 20 à 29 ans; 3 – Les 30 à 39 ans, etc.
- Chaque dent est identifiée selon le système international, pour chaque quadrant et chaque maxillaire: Le quadrant 1: dents 11 à 18; Le quadrant 2: dents 21 à 28, etc.
- Les facteurs étiologiques ont été classés en cinq catégories spécifiques:
1 – Les facteurs "divers", non classifiés comme tels (échec inexplicable; traitement endodontique combiné à la chirurgie, en une seule séance, etc.)
2 – Les lésions mixtes parodontales et endodontiques
3 – Les erreurs techniques (mise en forme insuffisante; sous-extension; sur-extension; cône d'argent mal ajusté; canal non traité; pivot et ciment sans gutta percha)
4 – Les fautes procédurales (perforation latérale fautive en fabriquant un pivot; faux canal; bris d'instrument; perforation mécanique lors de l'accès ou de la mise en forme; corps étranger)

5 – Les reprises de chirurgie (amalgame inadéquat; absence d'amalgame)

- Chaque spécimen cureté, fut placé aussitôt dans une solution de 10 pour cent de formaline. Le diagnostic histologique de ces spécimens a été fait en milieu hospitalier par un pathologiste. Les rapports de biopsies ont été classés en quatre groupes: 1 – Les granulomes apicaux (ou latéro-radiculaires); 2 – Les granulomes épithélialisés; 3 – Les kystes apicaux; 4 – Les "autres" (tissu cicatriciel, kyste résiduel, etc.).

Discussion

Les **tableaux 1** et **2** nous présentent la distribution de l'ensemble de la population étudiée (198 dents). On y observe que 99 hommes et 99 femmes figurent dans cette étude. Ceci est un pur effet du hasard. Le groupe d'âge le plus important vient des 30-39 ans (58 dents), suivi des 20-29 ans (50 cas) et des 40-49 ans (34 dents). Dans cette étude les 20-49 ans apportent donc 142 dents, ou 72 pour cent des cas. Il y a 15 individus de moins de 20 ans (7 pour cent) et 41 spécimens (21 pour cent) chez les 50 ans et plus. Ces pourcentages ressemblent beaucoup à ceux de l'étude de Stockdale et Chandler⁷.

Nous observons (**tableau 1**) qu'il y a une nette prédominance du groupe Centrales et Latérales, tant au maxillaire supérieur (99 dents sur 155, soit 63,87 pour cent de l'arcade) qu'au maxillaire inférieur (28 dents sur 43, ou 65,11 pour cent). Les dents du maxillaire supérieur sont 3.6 fois plus nombreuses que celles du maxillaire inférieur (155 dents sur 43). Cet écart est comparable à ce qu'on trouve dans d'autres études similaires²⁻⁸. Il est probable que, pour des raisons esthétiques, les patients cherchent à conserver prioritairement ce groupe de dents. Au maxillaire supérieur, les Centrales et Latérales sont plus exposées aux irritations pulpaire découlant de réfections répétées résultant de caries, de coups et blessures. . . Cela expliquerait le recours plus fréquent à l'endodontie pour ce groupe de dents, tel que présumé par Ingle².

Au maxillaire inférieur, l'anatomie coronale de ces mêmes antérieures est plus étroite, ce qui augmente la vulnérabilité de la pulpe aux attaques de la carie et des interventions iatrogènes.

Inversement, les dents postérieures supérieures et inférieures sont moins exposées aux coups. L'épaisseur de la couche émail-dentine protège mieux leur pulpe. Les besoins esthétiques moins grands pour le maintien de ces dents et les coûts relativement plus élevés asso-

TABEAU 1

Dents impliquées dans l'étude

Maxillaire supérieur					Maxillaire inférieur				
		Hommes		Femmes			Hommes		Femmes
		n	%				n	%	
Droit					Droit				
11	10	(14)	14	(17)	41	4	(16)	6	(33)
12	11	(15)	11	(14)	42	3	(12)	2	(11)
13	2	(03)	5	(06)	43	1	(04)	1	(06)
14	5	(07)	4	(05)	44	1	(04)	—	
15	2	(03)	3	(04)	45	3	(12)	—	
16	1	(01)	7	(09)	46	—		1	(06)
17	—		—		47				
Gauche					Gauche				
21	14	(19)	8	(10)	31	6	(24)	3	(17)
22	15	(20)	16	(20)	32	3	(12)	1	(06)
23	4	(05)	1	(01)	33	1	(04)	—	
24	4	(05)	7	(09)	34	1	(04)	1	(06)
25	5	(07)	3	(04)	35	—		—	
26	1	(01)	1	(01)	36	2	(08)	3	(17)
27			1	(01)	37	—		—	
Total	74	(100)	81	(101*)		25	(100)	18	(102)
155 dents					43 dents				

* Les % ont été arrondis pour simplifier la lecture

* Les % ont été arrondis pour simplifier la lecture

Tableau 1: Dents impliquées dans l'étude

Dans cette étude, toute proportion gardée, on voit que la majorité des retraitements se situent au niveau des antérieures, tant supérieures qu'inférieures. Il n'y a pas de différence statistique significative entre les centrales et les latérales supérieures.

TABEAU 2

Distribution par groupe d'âge et par sexe

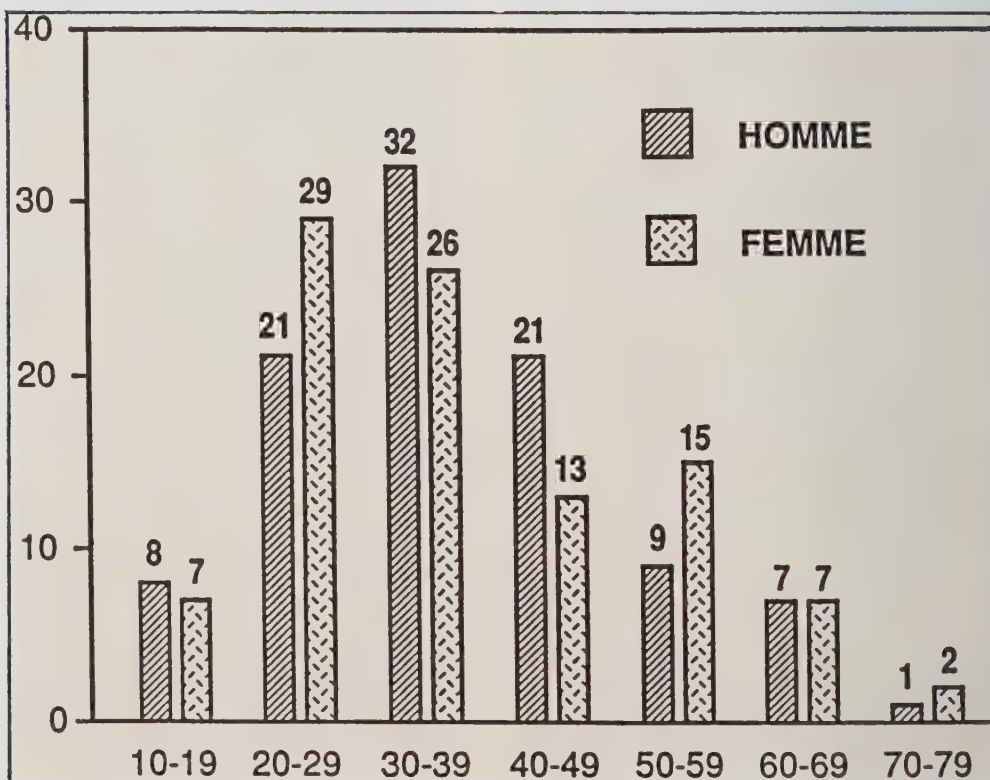


Tableau 2: Distribution par groupe d'âge × sexes

Le groupe d'âge le plus retraité est celui des 30-39 ans; toutefois, dans l'ensemble, les 20-49 ans forment 71,7 pour cent des cas analysés.

ciés à leur préservation font que certains trouvent le traitement endodontique de ces dents moins impératif; surtout chez les plus âgés moins portés autrefois à conserver ces dents⁹. Pour plusieurs, les difficultés techniques que représentent les traitements conventionnels et chirurgicaux des 2^e et 3^e molaires incitent à l'extraction. Par contre, plusieurs dentistes moins aptes à traiter les dents postérieures en arrivent à préférer confier cette tâche à des confrères mieux préparés. Toutes ces raisons peuvent expliquer, en partie, un besoin moins fréquent de chirurgies post-endodontiques sur ces groupes de dents.

Les rapports de biopsies des lésions curetées permettent de distinguer 135 granulomes (68,18 pour cent des cas), 32 granulomes épithélialisés (16,16 pour cent), sept kystes proprement dits (3,54 pour cent); les "autres" lésions constituent 12,12 pour cent des cas restant ou 24 dents. Mis ensemble, les granulomes épithélialisés et les kystes forment 20 pour cent de tous les cas. Le petit nombre de kystes proprement dits vient sans doute du fait que la présente étude ne s'intéresse qu'aux cas référés d'échecs.

On peut penser que plusieurs kystes ont guéri ou n'ont pas été portés à notre attention, ou que les dents impliquées furent extraites. Ceci expliquerait que leur pourcentage soit de moitié inférieur, ici à celui des études antérieures de Morse¹⁰, Winstock¹¹ et Stockdale⁷ et considérablement moins grand que les proportions trouvées par Baskar¹², Lalonde⁸ et Mortensen¹³.

La répartition de ces lésions (**tableaux 3a** et **3b**) ne révèle aucune différence par rapport au groupe sexuel des patients, ni par rapport à la position des dents sur les quadrants droits et gauches, ou encore par rapport aux maxillaires supérieur et inférieur.

L'analyse de l'histoire médicale inscrite aux dossiers n'a rien apporté de particulier pour expliquer les échecs étudiés. Bien que la majorité des cas fut accessible au traitement conventionnel, l'anatomie particulière de certaines racines (courbes, délacération, canal en ruban, etc.) a pu contribuer indirectement à l'apparition d'échecs, en rendant plus difficiles les diverses étapes de la mise en forme (voir les **illustrations 1, 2, 5, 6**). Le diamètre des lésions, variable de 1 à 16 mm, n'a pas indiqué de seuil au-delà duquel les échecs auraient pu être démarqués plus particulièrement.

L'origine parodontale-endodontique des lésions n'explique que 4,04 pour cent de cas associés à des erreurs de choix.

TABLEAU 3A

Diagnostics × Sexes × Maxillaires

Diagnostics	Granulomes		Granulomes épithélial.		Kystes		Autres		Total
	H	F	H	F	H	F	H	F	
Maxillaires									
Quadrants 1 et 2	50	57	12	13	3	1	9	10	
Sous-total	107 (69,03%)		25 (16,13%)		4 (2,58%)		19 (12,26%)		155 (100%)
Quadrants 3 et 4	14	14	4	3	3	—	4	1	
Sous-total	28 (65,12%)		7 (16,28%)		3 (6,98%)		5 (11,62%)		43 (100%)
Totaux des 2 maxillaires	64	71	16	16	6	1	13	11	
	135 (68,18%)		32 (16,16%)		7 (3,54%)		24 (12,12%)		198 (100%)

Tableau 3a: Diagnostics × Sexes × Maxillaires

La distribution des lésions diagnostiquées ne montre pas de différences statistiques significatives entre les hommes et les femmes, ou entre un maxillaire et l'autre. En nombre, nous avons 3,5 fois plus de dents du maxillaire supérieur 155/43.

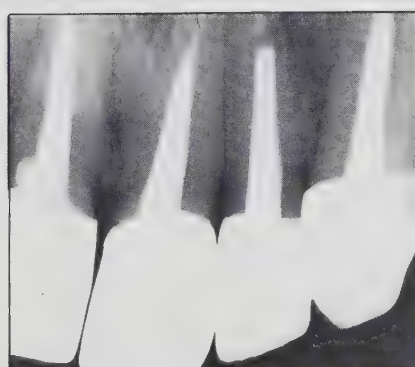
TABLEAU 3B

Diagnostics × Sexes × Quadrants ipsilatéraux

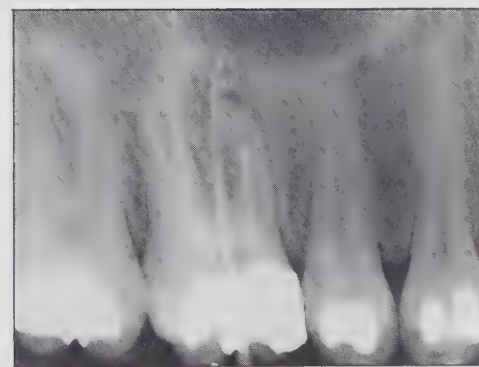
Diagnostics	Granulomes		Granulomes épithélial.		Kystes		Autres		Total
	H	F	H	F	H	F	H	F	
Côtés									
Côté droit (Quadrants 1 et 4)	26	41	8	8	3	—	6	5	
Sous-total	67 (69,07%)		16 (16,49%)		3 (3,09%)		11 (11,34%)		97 (100%)
Côté gauche (Quadrants 2 et 3)	38	30	8	8	3	1	7	6	
Sous-total	68 (67,33%)		16 (15,84%)		4 (3,96%)		13 (12,87%)		101 (100%)
Totaux des 2 côtés	64	71	16	16	6	1	13	11	
	135 (68,18%)		32 (16,16%)		7 (3,54%)		24 (12,12%)		198 (100%)

Tableau 3b: Diagnostics × Sexes × Quadrants ipsilatéraux

Il n'y a pas de différence statistique significative entre les quadrants du côté droit et ceux du côté gauche, quel que soit le sexe en cause.

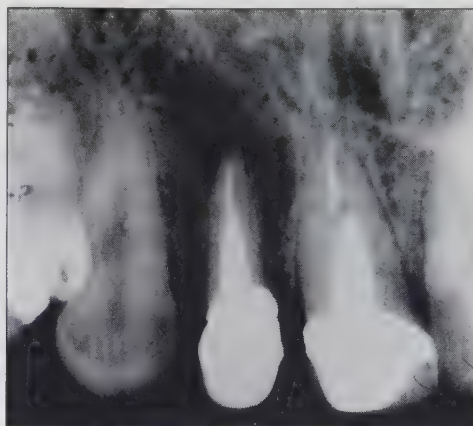


1. Un faux canal: Les fortes courbures apicales des latérales supérieures, de même que celles du canal mésio-vestibulaire des molaires supérieures ou des canaux mésio-vestibulaire et mésio-lingual des molaires inférieures prédisposent à la formation de faux canaux. La portion non traitée devient alors un foyer d'irritation.

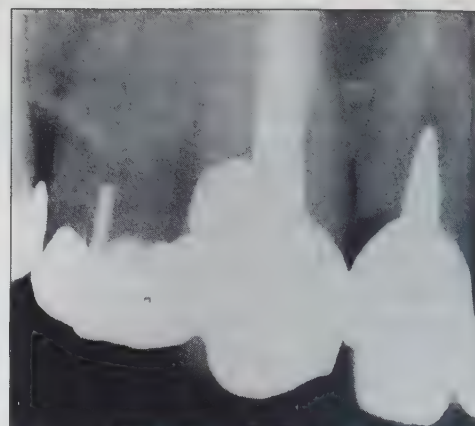


2. Le bris d'instrument: (un cône de G.P. suit la fistule) Les canaux fins et courbés occasionnent les bris d'instrument. Dans ces courbures il ne faut surtout pas tourner l'instrument comme une visse et on doit éviter l'emploi de limes usées.

En somme, l'explication fondamentale des échecs post-endodontiques dont il est fait mention, ne peut donc être trouvée statistiquement parlant, ni dans le vieillissement de la population (tableau 4), ni dans le sexe d'un groupe par rapport à l'autre, ni dans par la position des dents sur l'arcade, ni dans la nature kystique des lésions, ni même dans l'histoire médicale. D'autres causes doivent être envisagées. Prenant en exemple l'étude faite à l'University of Washington², nous avons dressé une liste d'erreurs techniques et une autre pour les erreurs procédurales; les reprises de chirurgie ont été classées à part, ainsi que les lésions parodontales; une classe "divers" a regroupé les facteurs difficilement classifiables. Analysés



3. Un apex bouché: Nous partageons l'avis de Schilder et Baskar qu'il vaut mieux garder l'apex ouvert pour obtenir une meilleure guérison des lésions périapicales. Ici, l'apex est bouché.



4. Une perforation latérale: La fabrication d'un pivot peut facilement conduire à une perforation latéro-radulaire, si l'opérateur ne tient pas compte de l'inclinaison axiale de la racine.

TABEAU 4

Diagnostic × Groupe d'âge

Diagnostics	Groupes							Total
	< 19	20-29	30-39	40-49	50-59	60-69	70-79	
Granulomes	12 8,89%	32 23,70%	40 29,63%	24 17,78%	16 11,85%	8 5,93%	3 2,22%	135 100,00%
Granulomes épithélial.		10 31,25%	10 31,25%	6 18,75%	5 15,63%	1 3,13%	32	100,00%
Kystes	1 14,29%	2 28,57%	2 28,57%	1 14,29%		1 14,29%		7 100,00%
Autres	2 8,33%	6 25,55%	6 25,00%	3 12,50%	3 12,50%	3 12,50%	1 4,17%	24 100,00%
TOTAL	15 7,58%	50 25,25%	58 29,29%	34 17,17%	24 12,12%	13 6,57%	4 2,02%	198 100,00%

Tableau 4: Diagnostics × Groupe d'âge

Les patients de 20 à 49 ans forment 71,7 pour cent de la population étudiée; les moins de 20 ans forment 7,58 pour cent des cas; ceux de 50 ans et plus forment 20,7 pour cent des cas. Il n'y a pas de relation direction entre l'âge et les lésions trouvées; les lésions sont simplement proportionnelles au nombre de traitements de canaux administrés.

TABEAU 5

Diagnostic × Groupe de causes

Diagnostics	Causes					Total
	Divers	Endo.-paro.	Technique	Procédure	Reprises	
Granulomes	20 14,81%	4 2,96%	79 58,52%	34 17,78%	8 5,93%	135 100,00%
Granulomes épithélial.	5 15,63%		19 59,38%	4 12,50%	4 12,50%	32 100,00%
Kystes	3 42,85%	1 14,29%	2 28,57%		1 14,29%	7 100,00%
Autres	3 12,50%	3 12,50%	9 37,50%	7 29,17%	2 8,33%	24 100,00%
TOTAL	31 15,66%	8 4,04%	109 55,05%	35 17,68%	15 7,58%	198 110,00%

Tableau 5: Diagnostics × Groupe de causes

Les erreurs techniques (percolations. . .) forment 55,05 pour cent des causes d'échec, suivi des erreurs de procédures 17,68 pour cent. Les reprises de chirurgies comptent 7,58 pour cent des cas, les lésions endo.-paro. 4,04 pour cent; les 15,66 pour cent restant concernent "divers" facteurs.

en fonction des lésions diagnostiquées lors des biopsies, ces groupes de causes (**tableau 5**) montrent la nette prédominance des fautes techniques (55,05 pour cent). Viennent ensuite les erreurs procédurales (17,68 pour cent) et enfin les reprises de chirurgies: 15 cas ou 7,58 pour cent, c'est-à-dire 12 chirurgies sans amalgames (soit 6 pour cent) et trois cas dont l'amalgame ne scellait pas l'apex (soit 1,5 pour cent). Les complications endo.-paro., qui sont en fait des erreurs de sélection, concernent 4,04 pour cent des lésions; les facteurs "divers" s'appliquent à 15,66 pour cent d'échecs. Voyons plus en détail les principaux groupes.

Les erreurs techniques:

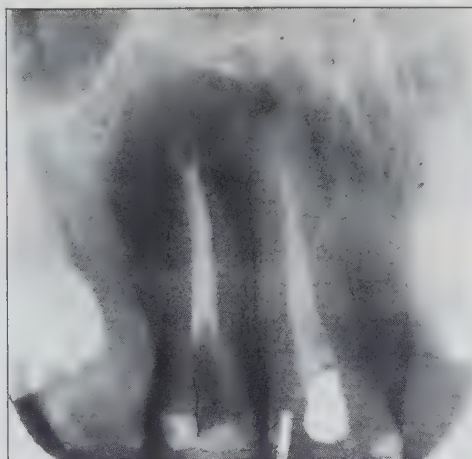
Les percolations apicales (obturation poreuse, manque de scellement apical. . .)	33,84%
Les mises en forme trop fines ou trop courtes	10,10%
Les cônes d'argent mal ajustés	0,51%
Un 2 ^e canal non traité	4,55%
La sur-extension du matériel d'obturation	3,03%
Pivot, couronne + canal vide	3,03%
Total	55,06%

Les erreurs procédurales:

Le faux canal	2,02%
Le bris d'instrument	1,52%
Les corps étrangers	0,51%
Les perforations latérales	7,08%
Les fractures verticales (limage exagérée du canal, traumatismes: pivot, fouloir. . .)	6,57%
Total	17,07%

Ainsi, les principales causes d'échecs semblent bien être iatrogènes, de nature. Ceci rejoint les conclusions de Ingle² et Daw² sur le même sujet.

Les facteurs "divers", quant à eux, sont rattachés à 15,66 pour cent des échecs (31 cas), ce qui est assez élevé. Cela s'explique par le fait que le classement des lésions en fonction des causes s'est fait aux niveaux macroscopique et radiographique. On sait que ces moyens limités ne permettent pas de tout voir¹³ ni d'extrapoler sur ce qui se passe aux niveaux microscopiques. Parmi ces 31 dents, pour lesquelles des causes spécifiques n'ont pas été identifiées (**Tableau 5**), il y a 20 granulomes (64,52 pour cent des cas), cinq granulomes épithélialisés (16,13 pour cent), 3 kystes (9,67 pour cent) et trois cas "autres" (9,67 pour cent). En termes cliniques, cette classe regroupe 14 dents dont les lésions péri-apicales ne semblaient pas s'améliorer;



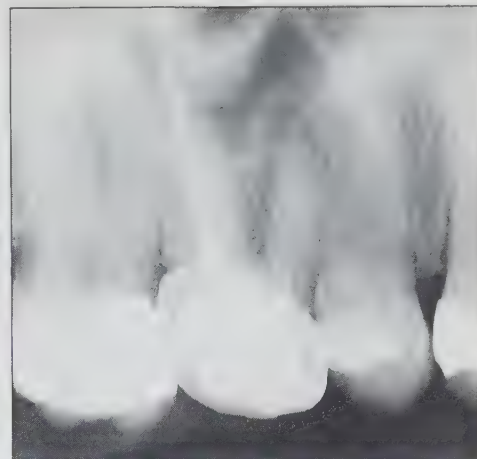
5. Obturation poreuse; apex ouvert et sous-obturé: Pour prévenir toute recontamination du système canalaire, il faut maintenir une obturation dense et stable de l'espace désinfecté: les pâtes ne conviennent pas; les apex ouverts invitent à la sur-obturation; les sous-extensions conduisent à l'échec.

un sous-groupe de sept dents d'infections récurrentes où la chirurgie dut être faite en même temps que le traitement d'endodontie; un autre sous-groupe de neuf dents inconfortables, bien que sans lésion apparente; enfin, un cas de kyste résiduel.

Par ailleurs, les 24 lésions classées comme "autres", c'est-à-dire autres que granulomes, granulomes épithélialisés et kystes, ces 24 dents comptent pour 12,12 pour cent de tous les cas analysés. Or, si on ignore les trois cas de lésions paro.-endo. et 1 cas de kyste résiduel, il reste un maximum de 20 cas, soit 10,10 pour cent, qui se sont avérés être des cicatrices apicales et des fractures.

Conclusion

Ainsi, dans cette étude, 68,18 pour cent des échecs rapportés sont constituées de granulomes apicaux, 3,5 pour cent sont des kystes, 16,16 pour cent sont des granulomes épithélialisés et 12,12 pour cent sont des cas "autres". La majorité des lésions analysées ne proviennent pas d'erreurs de sélection (i.e.: 8 cas de parodontie, 1 cas de kyste résiduel et une balance potentielle de 20 cas dans la catégorie "autres"), ni de la présence de kystes (seulement 7 cas). Ces lésions résultent principalement de granulomes ordinaires et épithélialisés (163 cas dont 12 provenant de reprises de chirurgies et 25 de facteurs "divers"); ces lésions résultent aussi de facteurs humains (126 cas provenant de fautes techniques et procédurales à l'intérieur de ces 163 lésions granulomateuses, soit 77,30 pour cent). Ce rapport pourrait approcher 100 pour cent, si on enlevait les retraitements chirurgicaux, puisque les lésions associées à ces cas ne repré-



6. Canal non traité: Aussi fins que soient les canaux, c'est tout le système canalaire qui doit être désinfecté et obturé afin de prévenir, à l'apex, la percolation d'irritants.

sentent pas des échecs de traitements endodontiques de première instance. De même pourrait-il en être de certains des 25 échecs du groupe "divers" (endo.-chirurgie en une séance, par exemple). Par rapport à l'ensemble de tous les cas, cependant, les fautes techniques expliquent 55,05 pour cent des échecs; les erreurs de procédures en expliquent 17,68 pour cent. Ces données corroborent les résultats d'études antérieures^{2,6,14} sur les échecs post-endodontiques. Ces chiffres confirment l'importance des facteurs techniques et procéduraux, quant au succès attendu en endodontie. Δ

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CLARIFICATION

We have reprinted the entire text of this article, since its original publication (*Journal*, June '90) contained publishing errors. The Editor apologizes to the author for any inconvenience caused.

Cet article est ré-imprimé dans son entièreté puisque, à sa première publication (en juin 1990 du Journal), il y a eu des erreurs de disposition - la rédaction s'excuse à l'auteur pour tout inconvénient occasionné par ces erreurs.



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“Smiles Tell Secrets, what does yours reveal...” As a Canadian dentist, could you display a sign containing such a statement outside or in the office window of your professional practice?

The *Canadian Charter of Rights and Freedoms*¹ guarantees to every individual certain fundamental freedoms subject to restrictions which might be considered justifiable or reasonable in the eyes of a Court.² Specifically, section 2(b) of the *Charter* guarantees that everyone is entitled to freedom of thought, belief, opinion and expression, including freedom of the press and other media of communication.

In an earlier article written for the *Journal* (November 1988, Vol. 54, No. 11), I discussed the Ontario Court of Appeal decision in the case of *Rocket and Price v. The Royal College of Dental Surgeons of Ontario*.³ This decision was later appealed by the College to the Supreme Court of Canada, and the decision has recently been handed down. In both courts, the primary issue was whether advertising restrictions placed upon dentists by regulations issued pursuant to the *Health Disciplines Act*⁴ violated the guarantee of freedom of expression extended by the *Charter*. The issue arose when two Ontario dentists, Dr. Howard Rocket and Dr. Brian Price were prominently featured in a Holiday Inn advertisement published in a number of Canadian magazines and newspapers under the heading: “New Faces of the Canadian Establishment”. The advertisement featured photographs of the two dentists alongside a text describing the growth and success of their chain of dental clinics, *Tridont Dental Centres*. As result of their participation in the advertising campaign, Dr. Rocket and Dr. Price were charged by the Royal College of Dental Surgeons of Ontario with violation of two subsections of Regulation 447 enacted pursuant to the *Health Disciplines Act*, R.S.O. 1980, c. 196.



About the Author

Ms. Tracey Tremayne-Lloyd is a full partner in charge of the health law group at Goodman and Carr in Toronto. She is past Chairman of the Canadian Bar Association-Ontario Special Committee established to study the legal implications of Acquired Immunodeficiency Syndrome. The Committee's Report was the first of its kind to be delivered in North America at the time, April 1986. She was also Chairman of Health Law for the Canadian Bar Association. Ms. Tremayne-Lloyd graciously agreed to write this article for the *Journal*, her first since November of '88.

Prohibitions restrictive

The first charge levelled against the doctors was based on s. 37(39) of Regulation 447, which classifies as professional misconduct all advertising not permitted by the regulations. The prohibitions in the regulations are exceedingly onerous and restrictive: no dentist, for example, is permitted to publish, display, distribute or use in

any manner whatsoever, any advertisement related to the practice of dentistry. A dentist's professional announcements in the form of business cards, office signs and announcements regarding changes in practice location or openings are also severely limited by this regulation. The regulation is so restrictive that requirements with respect to one's listing in telephone directories are specifically dictated with regard to typeface, size of lettering and content that will be permissible and thus not offensive to the professional misconduct provisions.

Basket clause

The second charge was based on s. 37(40), commonly referred to as the ‘basket clause’, which defines professional misconduct as any “conduct or an act relevant to the practice of dentistry that, having regard to all the circumstances, would reasonably be regarded by members as disgraceful, dishonourable or unprofessional”. The Court struck down only the advertising prohibitions contained in 37(39); the basket clause was left intact.

As noted in my earlier article, before these charges were heard by the Discipline Committee of the Royal College of Dental Surgeons, Drs. Rocket and Price applied to the Divisional Court of Ontario to stop the discipline hearing from proceeding. They sought an order declaring the s. 37(39) and (40) of Regulation 447 were in violation of the freedoms extended by s. 2(b) of the *Charter*. After the Divisional Court dismissed the application of Drs. Rocket and Price, the doctors sought and obtained leave to appeal to the Court of Appeal of Ontario.

The Court of Appeal reversed the decision of the Divisional Court with respect to one of the impugned provisions. Speaking for two of the three members of the Court, Mr. Justice Peter Cory held that commercial messages such as advertising were

protected by s. 2(b) of the *Charter*, and found that s. 37(39) therefore infringed the guarantee of free expression guaranteed in the *Charter*. In determining whether the limitation of free expression could be justified under s. 1 of the *Charter* (the section which provides that those freedoms guaranteed by the *Charter* may be subject to "reasonable limits"), Mr. Justice Cory concluded that s. 37(39) failed the s. 1 test as it was too broad. With respect to the basket clause, the Court of Appeal declined to grant a declaration that this section could not be applied to the dentists' conduct in this case, leaving such a decision to be decided on the merits by the Discipline Committee of the College after an appropriate hearing.

No justification

Following this decision, the Royal College sought and obtained leave to appeal to the Supreme Court of Canada (the final step in the legal process). Madame Justice Beverly McLachlin, speaking for the court, upheld the Court of Appeal decision finding that s. 37(39) violated s. 2(b) of the *Charter* and that this violation could not be justified under s. 1.

The first question the court examined was whether the protection afforded by s. 2(b) applied to commercial or economic free speech or only to political, artistic, or cultural expression. When I wrote my last article, *Irwin Toy v. The Attorney General of Quebec*, a case which specifically dealt with the issue of whether commercial speech fell within the purview of the *Charter*, was pending before the Supreme Court of Canada. Since that time, the Supreme Court of Canada has handed down its decision in this case as well. The court held that commercial expression was protected by s. 2(b) of the *Charter*.

Relying on *Irwin Toy* and *Ford v. The Attorney General of Quebec*, another recent Supreme Court decision which recognized "advertising's intrinsic value as expression", Madame Justice McLachlin had little difficulty in finding that commercial advertising was, indeed, protected by the *Charter*. Having found that the *Charter* applied to commercial speech, the Supreme Court of Canada had to determine whether s. 37(39) had actually infringed the guarantee of freedom of

"Until the College enacts new regulations, advertising by Ontario dentists remains unsettled."

expression. Justice McLachlin found that s. 37(39) did violate the *Charter's* guarantee of freedom of expression "by prohibiting legitimate forms of expression and by purposefully limiting the content of that expression".

Reasonable limits

Finally, the court had to determine whether the regulation governing advertising by dentists could be justified under s. 1; that is, whether the regulations which restricted advertising by dentists could be characterized as "reasonable limits" on their constitutionally guaranteed freedom of expression. Justice McLachlin had "no difficulty in concluding that it is essential" that professional societies be allowed to regulate the way their members advertise. However, she stressed the fact that if such regulations limit the right of expression they must be reasonable and "demonstrably justified in a free and democratic society". Like the majority in the Court of Appeal, Justice McLachlin found that, while the health regulations were rationally connected to the objective of protecting the public, they did not impair freedom of expression "as little as possible". Similarly, she found that there was not the required proportionality between the effect of the regulation and the objective of public protection. In explanation, Justice McLachlin stated that "The aims of promoting professionalism and preventing irresponsible and misleading advertising on matters not susceptible of verification do not require the exclusion of much of the speech which is prohibited by s. 37(39)". In this respect, Justice McLachlin pointed out that information such as office hours and the languages spoken by dentists would be prohibited by s. 37(39) despite the fact that such information

would be useful to the public and would not threaten the professional integrity of dentists.

Professional duty

Having found that the regulations infringed s. 2(b), and could not be saved by s. 1 of the *Charter*, the Supreme Court of Canada declared s. 37(39) invalid. However, it is important to note that while s. 37 (39) was struck down, Justice McLachlin did not sanction any and all advertising by dentists. Rather she stressed the need to have reasonable regulations which balance the College's need to prevent irresponsible and misleading advertising against its members' rights to provide the public with relevant information. Indeed, Justice McLachlin sent a clear message to the College when she stated that not only would it be possible to draft such regulations, but that a heavy duty rested on professional bodies to do so. As far as the content of these new regulations is concerned, it appears that given the language of the Supreme Court of Canada in *Rocket and Price*, the College may attempt to enact regulations which restrict attempts by dentists to use advertising to create a commercial market for their services — which is the function of advertising as we generally understand it.

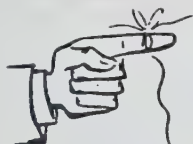
Until such time as the Royal College of Dental Surgeons of Ontario enacts new regulations the position of dentists who advertise remains unsettled. Although at this time there are no specific regulations dealing with permissible forms of advertising, the College may attempt, in the interim, to regulate such activity via s. 37(40). However, if the College is to invoke the general wording of the basket clause to regulate advertising, it will be required

to demonstrate that it is attempting to achieve the type of balance which the Supreme Court has come to recognize as a justifiable limitation on the right to commercial expression. In other words, the College will have to demonstrate that the particular activity in question is more likely to misinform and mislead than it is to provide information of genuine interest to the public. △

Références

1. *Constitution Act, 1982.*
2. Section 1 of the *Charter* provides that: The *Canadian Charter of Rights and Freedoms* guarantees the rights and freedoms set out in it subject only to such reasonable limits prescribed by law as may be demonstrably justified in a free and democratic society.
3. *Rocket v. Royal College of Dental Surgeons of Ontario*, [1990] S.C.J. No. 65
4. *Health Disciplines Act*, R.S.O. 1980, c. 196, as amended and Regulation 447, R.R.O. 1980, as amended.

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Getting The "Feel" of It: The Non-Visual Component of Dimensional Accuracy During Operative Tooth Preparation

L.M. Rucker, DDS*
G. Gibson, DMD**
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ABSTRACT

The purpose of this study was to determine what portion of a dentist's dimensional accuracy in the use of the high-speed rotary handpiece for operative tooth preparation can be attributed to visual control during the preparation. Dental students in a performance simulation laboratory recorded an 87.5 per cent handpiece control accuracy during a maxillary occlusal preparation, using normal intraoral mirror vision. When visual contact was eliminated during preparation, the accuracy declined only 13 per cent, to 74.5 per cent. The results of this study lend support to the development and use of dental clinical simulations and approaches which encourage proprioceptive and other non-visual skills, in addition to visual skills, during preclinical and clinical dental education.

SOMMAIRE

Cette étude avait pour but de déterminer le degré de précision dimensionnelle qu'un dentiste peut avoir visuellement lorsqu'il prépare une dent pour des fins opératoires à l'aide d'une pièce à main à grande vitesse. Dans une épreuve simulée en laboratoire, des étudiants en médecine dentaire ont obtenu une moyenne de 87,5 p. cent pour le degré de précision avec une pièce à main en préparant une occlusion maxillaire à l'aide d'un miroir intra-buccal ordinaire. Sans miroir, le degré de précision tombait à 74,5 p. cent, une baisse de seulement 13,0 p. cent. D'après les résultats de cette étude, il serait souhaitable, semble-t-il, d'élaborer et d'utiliser des exercices de simulation et des méthodes clinique pour développer, en plus des habiletés visuelles, des habiletés proprioceptives et non visuelles durant la formation

préclinique et clinique des étudiants en médecine dentaire.

Most dentists, in spite of their best possible attention to equipment utilization, proper mirror usage, and auxiliary utilization, perform a certain portion of their operative procedures with little or no visual control during the instrumentation segment of the procedure. The operator can see, or do, but often it is not possible to both see and do, simultaneously. Admittedly an operator may be able to see before beginning the act where and how the instrument can be applied, and may stop the operation periodically to inspect visually the accuracy with which the desired end product is being achieved, but may still be unable to maintain visual control throughout the entire procedure. Posterior maxillary disto-facial areas and posterior mandibular disto-lingual and disto-facial areas offer frequent challenges of this sort. This problem may be due in part to such factors as the use of air turbine water sprays, the limitations of access related to size and configuration of the operator's hands and/or instruments, patient anatomy, mirror size and utilization, and positioning of equipment within the operating setting.

In addition to visual feedback during dental performance, dentists are exposed to tactile, auditory, and kinaesthetic feedback as well. These senses are commonly lumped together when we refer to getting the "feel" for a certain procedure or instrument.¹ For example, the operator may respond to shifts in the pitch and intensity of the sound of the air turbine by altering the force applied to the handpiece. Dentists have reported difficulties with refinements of control whenever extreme acoustical circumstances in the practice setting have made it impossible for them to hear the high-speed

handpiece during an operation. Similarly, the slightest tactile shift in the finger fulcrum point will cause the operator to readjust the access or fulcrum, long before there are any discernible visible effects of the shift. Operators who have not been trained in the consistent use of rubber gloves become highly tuned to the gloves' effects on tactile feedback.

Psychologists researching non-dental micromotor skills (that is, perceptual-motor skills for which the end-product tolerances are less than 1.0 mm in three dimensions) have found that even when all visual feedback is eliminated for the performance of a task, subjects still have considerable kinaesthetic feedback and are usually able to operate surprisingly well.²

The intent of the current study was to determine how much of a dentist's clinical performance is controlled by what the dentist sees, and how much by other, non-visual components.

Materials and Methods

Each member of the first year dental class at the University of British Columbia (n=40) was given two identical upper right first bicusps, marked as shown in **Figure 1**, with tiny red dots on each cusp tip (for calibration of measurements), and black dots in each of the two occlusal pits. The students secured each tooth in turn into their fully dentulous dentoform and prepared a single "slot" preparation for each tooth in turn, using a 331 bur (1.0 mm diameter) in a high-speed handpiece, following the central developmental groove, centering the extremal mesial and distal on the respective pits so that the final "slot" would be as shown in **Figure 2**, extending ideally to a point 0.5 mm beyond each pit, and crossing the highest (occlusal) point of the triangular ridges at points 0.5 mm facial and lingual to the central groove. The

pulpal control depth was specified at 1.7 mm throughout the "slot". Students were advised that the allowed tolerances for this exercise were ± 0.5 mm in all three dimensions. This was identical to an exercise that all of the students had performed successfully and repeatedly four months earlier in their preclinical program, including attention to the four critical control points.

For one tooth, the preparation was to be done using mirror, as usual. For the other, the mirror was removed from the mouth at all times during the engagement of the high-speed handpiece (air turbine).

Half of the class ($n=20$) performed the mirror preparation first, and the other half performed the blind cut first, in order to examine for any cross-over effect.

All preparations were performed at the same time in the preclinical Performance Simulation Laboratory, under the direct supervision of faculty members. During the blind cut, there was no visual contact by students with the tooth surface being operated upon, although they were encouraged to observe freely prior to and after handpiece engagement of the tooth, and they were allowed with all cuts to modify their preparations as needed, with the same high-speed handpiece bur. They were also allowed to use their periodontal probes to assess the accuracy of pulpal depth.

All prepared dentoform teeth were reattached to their pre-preparation measurement grid-sheets. The sheets were then shuffled so that the pairs of preparations produced by any student would not likely be adjacent. All tooth preparations were measured for dimensional accuracy by the same two experts who had measured and marked each of the eighty teeth prior to preparation. In addition to their evaluation for dimensional accuracy, the teeth were also examined for evidence of accuracy of bur angle during preparation. Measurements were recorded without the expert's knowledge of whether the individual tooth being measured was a blind cut or a visual cut, without knowledge of the tooth's recorded planned dimensions (except for the pulpal depths, which were always 1.7 mm), and with no knowledge of which student had performed the preparation.

Results

Prior to this study, tolerances for

acceptable accuracy for dental students' early level of dimensional control during high-speed rotary instrumentation was established at ± 0.5 mm. This standard is used for the first half of the first preclinical training course at the University of British Columbia, and tolerances are narrowed to ± 0.3 mm as micromotor skills competence improves during the year. This closely approximates the ACORDE specifications regarding pulpal depth.³ There are no other standards cited in the literature for what constitutes, or should constitute, adequate dimensional control for preclinical operative tooth preparations. The UBC tolerances have good clinical relevance, according to comparisons of student dimensional control results with those of clinical instructors for the same exercises.

In this study, control in the three spatial dimensions (X, Y, and Z) at each of the mesial and distal extremal points of the slot cut, and control in two spatial dimensions (Y and Z) at the highest (occlusal) points where the slot crossed the triangular ridges (both facial and lingual to the central groove), allowed a maximum possible dimension accuracy score of 10. (The third [X-axis] dimension at the high points was meaningless because the prepared slot parallels the tooth's X-axis.)

Standard statistical analyses were performed on the data. Because the dimensional data was based on a point count of ten (depending upon how many dimensions at each of the control points were within accuracy tolerances), non-parametric comparisons (Wilcoxon sign rank test) were applied. For each preparation and for each student, patterns of accuracy were examined and comparisons were made using individual and grouped data for blind cuts, visual cuts, practice effect (whether the second preparation was more accurate than the first), and cross-over effect (whether it mattered whether the blind cut was performed first or was performed second).

The grouped data for the normal preparation, in which students used vision throughout the cutting of the preparation, showed an accuracy of 87.5 per cent. When the preparation was performed in the absence of vision, the accuracy declined 13.0 per cent to 74.5 per cent (Table 1).

Not all students' dimensional accuracy was lower when cutting without visual contact. Each student's Blind Accuracy Score (out of 10) minus the student's Visual Accuracy Score (also out of 10) is presented graphically in Figure 3. It will be noted that six students experienced no difference whatsoever in their accuracy, although most experienced between one and three points greater error when cutting in the absence of visual contact.

Errors resulting from poor control of the bur angle during the occlusal slot preparation (i.e. when the bur deviated more than 15 degrees from the long axis of the tooth) were few in number. Accuracy using this criterion decreased from 95.6 per cent under visual control to 93.4 per cent in the absence of vision (Table 1).

There was no statistically significant difference whether the blind cut or visual cut was performed first. There was also no statistically significant difference associated with the second tooth preparation (whether visual or blind) compared to the first. That is, there was no practice effect (Figure 4).

Discussion

The study data clearly indicate that a significant percentage of accuracy in tooth instrumentation is based on factors other than visual control during the operation.

The high-speed handpiece was chosen for this study for several reasons. First, its proper use demands a high degree of dimensional accountability. Second, among the commonly used dental instruments, its use has the lowest force-to-finesse ratio. This factor might be expected, if anything, to reduce the operator's reliance on pressure cues and

TABLE 1

Comparison of Visual and Non-Visual Preparation

	n	% Dimensional Accuracy (X $\pm$ SD)	% Bur Angle Control (X $\pm$ SD)
Visual Cut	40	87.5 $\pm$ 13.3	95.6 $\pm$ 7.3
Blind Cut	40	74.5 $\pm$ 17.4	93.4 $\pm$ 7.3

certain kinaesthetic feedback, compared with the use of other instruments in the dental armamentarium, thereby maximizing the proportion of visual control required for its use. Bearing this in mind, the results of this study seem all the more striking.

Most measures of learning success in preclinical and clinical dental education are based on visual parameters:⁴⁻⁶ how results should *look*, rather than what the integrated process feels, sounds, or even smells like. This is in part an effect of limited performance simulation settings for preclinical training. As a result, the instrument control of dental students is encouraged toward a high level of visual dependency. Such orientation early in psychomotor training is likely to have a compounded encumbering effect later as the dentist attempts to learn to utilize non-visual sensory feedback.⁷

The teaching simulations used in dental education have varied widely, from extracted teeth mounted in simple plaster cast bases and treated on a benchtop, to the most sophisticated and complex performance simulations, complete with integrated proprioceptively-derived handpiece and instrument delivery, 3-way syringe and high-volume suction.^{8,9} However, most efforts toward teaching simulations have been directed toward improved intraoral tissue realism or toward devices which improve visual feedback at the expense of non-visual skills integration.¹⁰ Very little has been applied to specification of the spatial relationships of the operator to his patient and his setting,¹¹ despite the fact that these relationships strongly affect proprioceptive control and accuracy.^{12,13} Often, poor preclinical simulations (or good simulations which are unrealistically utilized) give dental students unrealistic expectations regarding visual contact during treatment,¹⁴ and they find themselves frustrated when they move into a clinical setting. Their contorted postures and positions in clinical settings may reflect their attempts to duplicate the visual control expectations carried forward from the preclinical settings.

The results of this study do not suggest a diminished emphasis on the visual preparation, planning and assessment of intraoral operations, but rather an enhancement of current education and clinical practice in ways which address other important and significant non-visual domains of control.

FIGURE 1

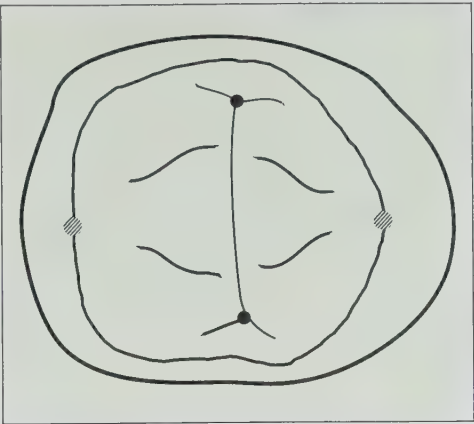


FIGURE 2

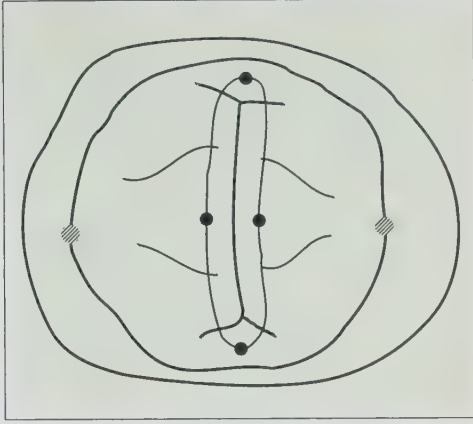
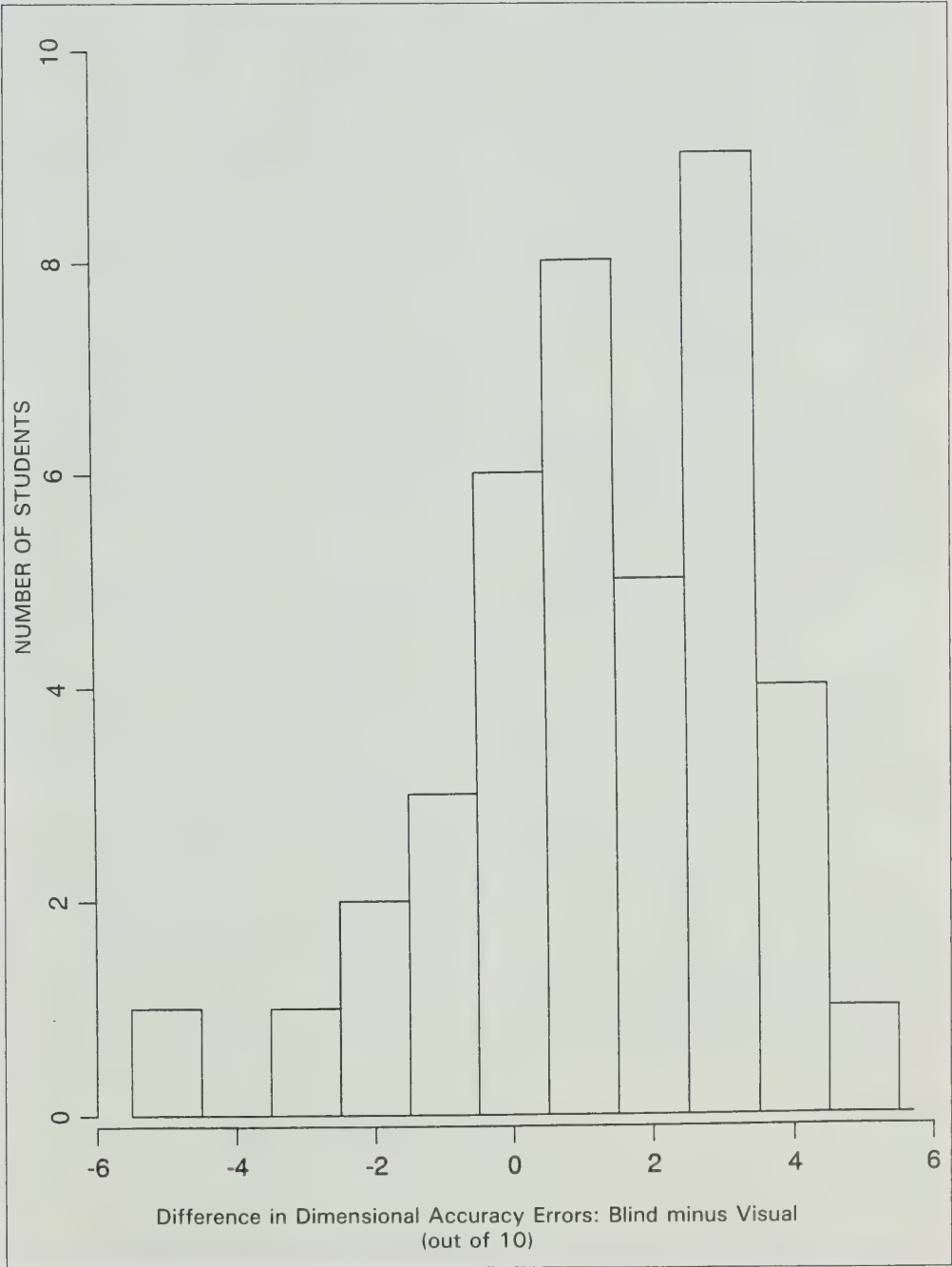


FIGURE 3

Dimensional Control: Blind vs Visual.



When applying information derived from preclinical dental students to the clinical dentist, it seems likely that the operator's percentage of reliance on non-visual instrument control will, if anything, *increase* with experience and confidence. It would seem especially important that clinicians work in optimal environments which support their proprioceptive needs and non-visual exteroceptive needs as well as visual needs. It is not enough for a setting merely to provide good light where it is needed and to offer an obstructed view of the operating site if the setting components (or their arrangements) demand that in order to utilize such a view, the operator is forced to assume contorted postures which would compromise kinaesthetic sensitivity or operator balance. In fact, the current study would suggest that if circumstances demanded compromise of visual or non-visual sensory input during operation, it could be preferable to compromise vision rather than the non-visual input. Fortunately, it appears that such compromises are rarely called for. Most modern operating settings can be adjusted and/or utilized using a proprioceptively-derived approach which allows both optimal visual and non-visual control.^{15,16}

Conclusions

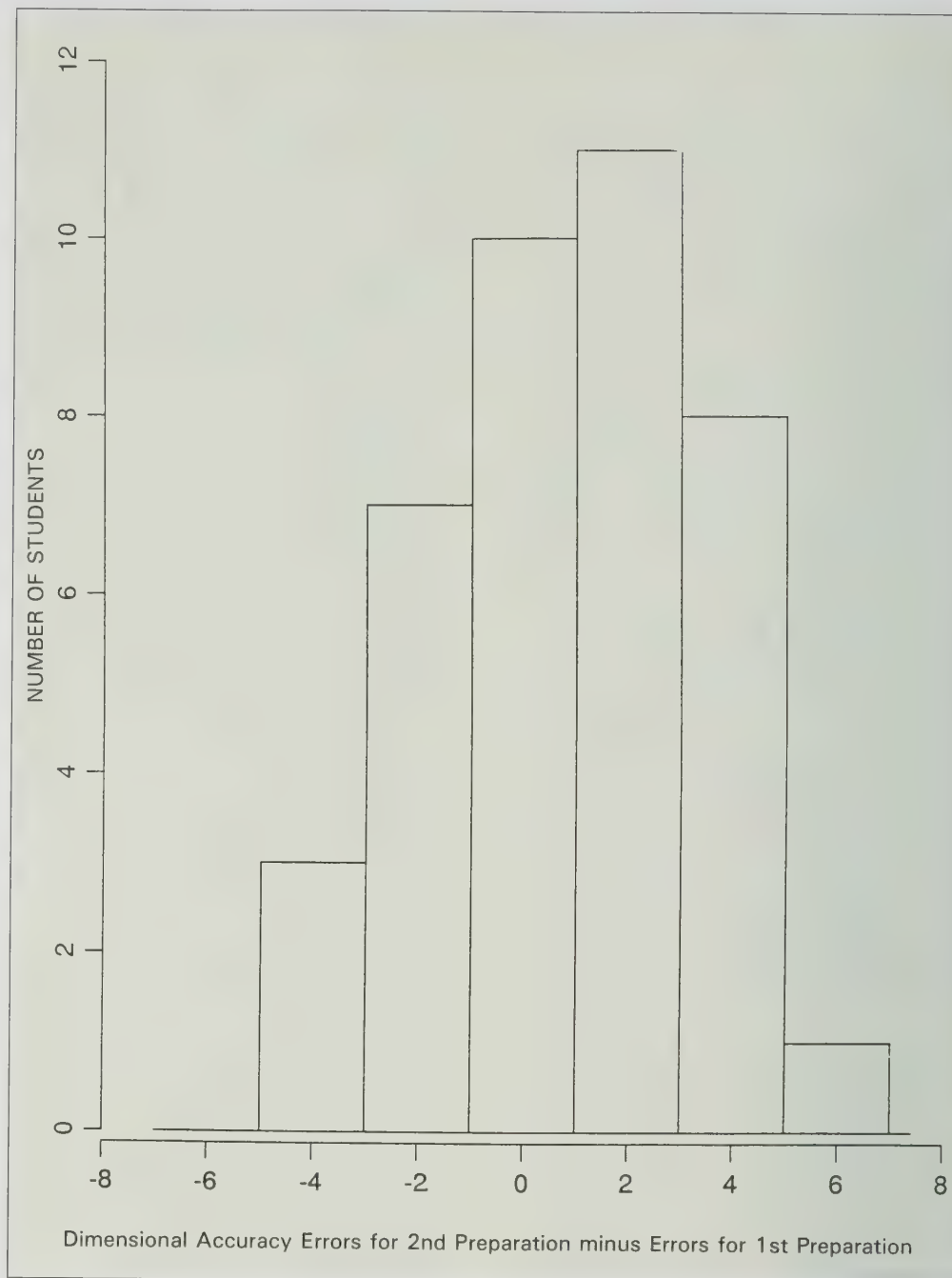
This study indicates that only a small portion of a dentist's dimensional accuracy in the use of the high-speed rotary handpiece for operative tooth preparation can be attributed to visual control during the preparation. Dental students in a performance simulation laboratory recorded an 87.5 per cent handpiece control accuracy during a maxillary occlusal preparation, using normal intraoral mirror vision. When vision was removed during preparation, the accuracy declined only 13 per cent, to 74.5 per cent. The results of this study lend support to the development and use of dental training simulations and approaches which encourage proprioceptive and other non-visual skills, in addition to those which encourage visual skills, during preclinical and clinical dental education. △

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FIGURE 4

Practice Effect.



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Preliminary data from this study were reported at the American Association of Dental Schools' meeting in Montreal, Quebec in March, 1988. The authors express their appreciation for the support of the Statistical Consulting and Research Laboratory at the University of British Columbia.

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An Exploratory Study on Increases in Masseteric Muscle Activity Induced by Caffeine

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ABSTRACT

In a crossover double blind experimental design, the nocturnal masseteric activity of 14 selected volunteers was evaluated by means of a portable electromyograph recording unit. The recordings lasted for a period of 16 days following ingestion of caffeine or placebo for five specific days each. There were no significant differences between caffeine or placebo on masseteric activity associated with bruxism. But when the two periods were compared, there was a tendency towards reduction of masseteric area activity and increase of stress levels in the second period of ingestion.

Key Words: Bruxism, Muscle hyperactivity, Caffeine effects.

RÉSUMÉ

Dans une expérience à double insu, où le groupe témoin devient le groupe expérimental et vice versa, l'activité massétérique nocturne de quatorze sujets choisis fut évaluée par l'entremise d'une unité portative d'enregistrement électromyographique. Les enregistrements portèrent sur une période de seize jours, suivant l'ingestion de caféine ou de placebo, pour cinq jours chacun. Il n'y a pas eu de différence significative entre la caféine et le placebo sur l'activité massétérique associée au bruxisme. Mais lorsqu'on compare les deux périodes, la tendance montre une réduction de l'activité de la région

massétérique et un accroissement du niveau du stress pour la seconde période d'ingestion.

Mots clés: Bruxisme, hyperactivité musculaire, effets de la caféine.

INTRODUCTION

Bruxism, a psychoneurophysiological disorder, has been related to different etiological theories. One such theory suggests that bruxism is a central and autonomic nervous system phenomenon,^{1,2} which seems to be a promising course of study. Research supporting this theory has been based on:

- observations of animals that have either stimulation of cortical or subcortical regions.^{3,4}
- observations of humans in all-night studies using electrophysiological measurements.^{5,6}
- observations of animals and humans where gnawing and bruxism were induced pharmacologically.⁷⁻⁹

The theory elaborated from these observations hypothesized the role of the nigrostriatal system which influences specific cortical and limbic areas and which is responsible, via dopamine, for behavioral arousal.^{2,6,7}

Among the drugs inducing bruxism is amphetamine, one of the most potent sympathomimetic amines, known to have a powerful central nervous system (CNS) stimulant action.¹⁰ Caffeine is also a potent CNS stimulant;¹¹ its physiologic and psychotropic effects have been reviewed.¹² The spontaneous locomotor activity which results from ingestion or injection is supported by several studies.¹³⁻¹⁶ Also, caffeine has direct increasing effect on skeletal muscle contractility due to mobilization of sarcoplasmic calcium, although that

effect requires higher concentrations than those achieved in daily consumption.^{11,17} But at usual consumption, the effects of caffeine on CNS influences neuronal activity¹⁶ and may activate the nigrostriatal pathway, thus causing decreased caudate neuron activity via dopamine increment released from nigrostriatal nerve ending.^{18,19}

Caffeine is widely available; the mean daily consumption is estimated at 200 mg per capita.²⁰ Taking personal, psychological and medical considerations into account, the ingested amount for the same individual may significantly influence his health and his behavior from one day to the next.

Among numerous factors which influence the CNS and which interact or interfere are medications, drugs, disorders, diseases, and stress. These factors and their interactions should be considered when treating bruxism and patients suffering from myofascial pain disorders (MPD).

The aim of the following study was to investigate whether caffeine can induce increases in human masseter muscle nocturnal activity.

METHODS

Subjects:

A sample of 14 volunteers was taken from the School of Dentistry. Limited financial aid was offered to each volunteer to defer expenses. Initially divided into two groups, they were randomly assigned to an experimental or a control group and, after completing the use of a placebo or caffeine, reassigned to the other group. Men and women were equally divided in each group, since there are significant differences in their catabolism rate.²¹ The groups were equally divided according to the

following factors: age, weight, personality, occupation and caffeine consumption:

- a. age: older subjects were found to be more susceptible to caffeine effects;²²
- b. weight: the dose was given in a quantity unrelated to the weight;
- c. personality on self-assessment: an effect of personality trait upon caffeine catabolism has been found;²³
- d. occupation: it may influence the subject's daily stress;
- e. caffeine consumption: since tolerance of the usual consumer may influence the response to caffeine exposure.^{16,24,25}

Subjects were required to be healthy. They filled out a medical questionnaire regarding hepatic, renal, gastrointestinal, cardiac, pulmonary and CNS conditions. These data were essential to our research on caffeine because:

1. it stimulates CNS
2. it is metabolized in the liver
3. it acts on kidney to produce diuresis
4. it increases gastric and other secretions
5. it stimulates cardiac muscle
6. it acts on the respiratory centre and the smooth muscles.^{11,17}

Subjects were also required to be non-smokers,²⁶ free of any drug and medication for possible interaction or interference.^{11, 16, 21, 27} Women were required to be non-pregnant, not intending to become pregnant, and not using contraceptive pills which slow the rate of caffeine catabolism.¹¹ Subjects had to meet the criteria of an oral examination — that is:

1. to have no edentulous spaces,
2. to experience no soreness on masticatory muscle palpation,
3. to have no evidence of bruxism or MPD and temporomandibular disorder, in order to avoid any onset of episode or of crisis.²⁸

The procedure was explained to the subjects; a consent form was read to them and they were asked if they completely understood the procedure. After all questions were answered, they signed the form and, finally the investigator also signed the form.

The two groups were equally balanced (**Table I**). The mean age of one group was 26.2 years and the other 26.5 years. The mean body

weight of one group was 155.7 lbs (70.6 kg) and the other 154.3 lbs (69.9 kg). The mean usual caffeine consumption was 135 mg and 157 mg, respectively. There were no significant differences in these mean values.

Instruments:

Nocturnal unilateral masseter muscle activity, through the use of three surface electrodes, was recorded on a portable electromyographic (EMG) unit and on a standard tape recorder. The rationale, description, operational characteristics, specifications, applications and usage of a portable EMG unit have been described in the literature.²⁹⁻³¹ The activity of the masseter muscle produces a signal in the EMG unit (BF 100) that is amplified and relayed to the portable tape recorder (Realistic C.T.R.-56). A minimal threshold was determined for each subject to eliminate recording of minor muscle contractions. The subjects were instructed in the management and use of the portable EMG unit. They were asked to give a demonstration to ensure proper manipulation. An instruction sheet was given to each subject and they were asked to report any signs of trouble. The nocturnal information was transferred to a chart-recording instrument equipped with a pulse identifier (Grass Model 79 EGG and Polygraph Data Recording System Grass, Instrument Co. Quincy, Mass. U.S.A.). Muscle activity was then evaluated for its frequency and duration. The presentation and demonstration of statistical reliability and validity of that instrumentation and procedure have been verified.³²

Stress measurement:

Subjects were asked to report any changes in their social, marital, professional life, and eating habits before and during the experiment. Each night they were required to rate their subjective stress on a scale of 1 to 5. Stress was rated on five specific mental state descriptions—numbers 1 and 5 being, respectively, the lowest and highest stress-related description. The purpose of those queries was to evaluate the influence of stress on the recordings. Such influence has previously been reported in the literature.^{31,33,34} On the stress rating sheet, space was also provided to record the day, date, amount of sleep, and other comments. The rating scale for stress was as follows:
1 = a very relaxed day. You felt little or

no tension during the day;

- 2 = relaxed. You felt some tension during the day but not enough to be annoyed or enough to interfere with your behavior.
- 3 = neither relaxed nor stressed. Some tension was observed during the day but was handled easily. It did not interfere with your ability to do things, although you were quite aware of the presence of tension.
- 4 = a slightly stressful day. The stress began to interfere with your ability to do things. You were continually aware of stress and seldom felt relaxed during the day.
- 5 = very stressful day. The stress began to be incapacitating. It was difficult to carry on with everyday activities; you noticed some major problems in interacting with people or doing your work as a result of stress.

Procedure:

In a crossover, double-blind experimental design, the unilateral masseter activity was evaluated over a period of 16 nights. To minimize risks for the subjects and for the purpose of standardization, a control diet was maintained for the duration of the experiment (16 days). The first three days, subjects in both groups eliminated caffeine already ingested and became familiar with nocturnal portable EMG. The next five nights, subjects, in their respective group, ingested caffeine or placebo just before bedtime. On the three subsequent nights, no caffeine was consumed to allow excretion and withdrawal.^{11,16} For the last five nights, the two groups were crossed-over to the opposite drug and their nocturnal activity was recorded again after caffeine or placebo intake (**Table II**).

A control diet contained no coffee, tea, cocoa, chocolate, or cola. These beverages constitute more than 90% of the daily intake of caffeine.^{20,11} Restriction was extended to smoking, drugs, alcohol, and medication, which can interfere or interact with caffeine metabolism and catabolism.^{11,16,35} A description of the control diet was found on the back of the stress rating sheet.

Drug and Placebo:

Placebo or free base preparation of caffeine was introduced in capsules (size #3) manufactured by E. Lilly & Co. The manufacturer of the caffeine was J. T. Baker Chemical Co. of Phillipsburg N.J., lot #407511 and the manufacturer of the placebo containing

dextrose was Purepac Labs, Elizabeth N.J., lot #890931. The capsules were filled by the Department of Pharmacology at the Buffalo General Hospital (in an amount of 200 mg + or - 3% for the caffeine). Similar or higher doses have been given to human beings in previous studies.^{35,36} The chosen dose was equivalent to the mean daily intake²⁰ and was weaker than that used in the therapeutic dose.¹¹ Caffeine and placebo were ingested by the subjects in their respective experimental and control groups for five consecutive nights, just before bedtime.

RESULTS

The frequency and duration of masseter activity were quantified (Tables III and IV) and the results were tested for statistical significance by a two-way all within Anova test, Latin square (Table V), with $\alpha = 0.05$ for all comparisons.

Caffeine compared to placebo did not have a significant increase in masseter nocturnal activity nor did it show difference in the order of usage. But when comparing period I with period II, there was a tendency towards a reduction of masseteric area activity in both groups. The non-parametric Wilcoxon matched-pairs signed-ranks test was applied to these differences. At $\alpha = 0.05$ level (two-tailed test), the frequency and duration for these two periods did not significantly differ.

On the stress self-assessment scale (Table VI), the amount of stress during the second period was greater, possibly because the subjects were getting through the Christmas exam period. A non-parametric measure of correlation was applied between this increased stress and decreased-activity tendency. At $\alpha = 0.05$ level (one-tailed test) the Spearman rank correlation coefficient revealed significant association of stress with both frequency and duration.

DISCUSSION

Because of the variability in activity from night to night (which is the norm), and variability due to recording errors, statistical analysis with a small sample must be done as an all within-subjects design. Long baseline recordings are strongly advisable prior to experimental manipulations.³⁰ Such requirements were not fulfilled in this experiment because of limited time and our subjects' availability, which could have influenced our results. Habituation to the recording device may require

TABLE I

Group I

Subject	Sex	Department	Age	Weight		Personality	Caffeine intake
				lbs.	kg		
1	M	PG	39	179	81.2	B	200
3	M	SO	23	175	79.4	Ex	100
5	F	SO	22	108	50	B	100
7	M	SO	23	140	63.5	Bin	200
9	F	Fr	22	140	63.5	Bin	150
11	M	Ju	24	203	92.7	B	0
13	F	HK	31	145	65.7	Bex	200
Mean			26.2	155.7	70.6		135.7

Group II

2	M	PG	29	150	68.04	Bin	250
4	M	PG	36	195	88.4	B	250
6	F	SO	23	124	56.2	Bex	100
8	M	Fr	22	135	61.24	Bex	200
10	F	SO	23	118	53	B	100
12	M	SO	23	163	73.5	Bin	100
14	F	ST	30	195	88.4	B	100
Mean			26.5	154	69.9		157
Department: Postgraduate Student (PG), Sophomore student (SO), Freshman Student (Fr), Junior Student (Ju), Housekeeper (HK), STAFF Member (ST).							
Personality: Subject had choice of Extrovert (Ex), Balanced Extrovert (Bex), Balanced (B), Balanced Introvert (Bin), Introvert (In).							

3 to 4 days;²⁹ we allowed 3 days for habituation to the EMG unit and for caffeine excretion. As our results showed a tendency for a decrease in activity in the second period, it may be that a longer habituation time should be utilized. The number of recorded nights under the different experimental conditions should have been greater, as established in numerous previous studies.^{30,31,37} Because tolerance may develop within 3 to 4 days,^{24,25} we limited our recordings to 5 nights, under the different experimental conditions.

As we did not want to induce wakefulness,³⁶ and as caffeine reaches peak plasma level within one hour,¹¹ the drug was ingested just before bedtime. In some subjects, however, it was strong enough to interrupt their sleep. Caffeine half life is 3 to 7 hours;¹¹ we assumed that three days were sufficient for excretion of caffeine and to allow adenosine receptors and cyclic adenosine monophosphate accumulation to return to normal. These are sites where methylxanthines exert their probable action,^{11,15} and are probably responsible for the development of the withdrawal syndrome which is characterized by a headache, most likely caused by a cerebral blood pressure drop.^{11,12} At

least six out of the 14 subjects verbally reported such headaches and restlessness during excretion periods.

The possible influence of psychological factors has already been mentioned as a contributing factor in masseter muscle activity and in MPD patients. One of the features of nocturnal bruxism is its apparent relationship to stressful events; and it has been observed in subjects undergoing naturally occurring stressful events such as marital problems, loss of employment, final exams, family feuds, etc.^{30,31} We did not get similar results, although subjects were going through a Christmas exam period. Such results have been found before.³⁸ The placebo effect is real, and has been used with some success as a therapeutic intervention.³⁴ The fact that the subjects might have believed, in the first period, that they were ingesting caffeine while taking placebo may have contributed to the results we obtained. Some subjects reported believing that they were ingesting caffeine, whereas it was revealed after the experiment that they were taking placebo. Furthermore, the fact that subjects knew at bedtime that they would record muscle activity, and that they could, upon waking, evaluate their amount of activity on the tape-recorder may have influenced the

TABLE II

CROSSOVER DESIGN

Period I

Days	1 to 3	4 — 8
Group I	Excretion	Drug A
Group II	Excretion	Drug B

Period II

Days	9 to 11	11 — 16
Group I	Excretion	Drug B
Group II	Excretion	Drug A

behavior under study, and is a potential limitation to the device used.³⁰ In another experiment which evaluated anxiety due to caffeine withdrawal through the use of EMG, placebo was equally effective in reducing the measure of anxiety monitored.³⁹

Behavioral, developmental, and genetic factors account for tolerance and sensitivity to caffeine.¹¹ It is thus difficult to establish whether bruxers and MPD patients who experience higher levels of anxiety and frustration,^{2,40} also have higher sensitivity to caffeine, so that greater intake or variation in their consumption may add to that anxiety and frustration. In a psychiatric unit, 34 out of 135 patients were heavy coffee drinkers and had an elevation in anxiety states.⁴¹ In another study, subjects reported feeling anxious after omission of caffeine.⁴² Therefore, regarding the relationship between caffeine and MPD patients, the question remains: is anxiety a result or a causal factor?⁴³

In order to get a better insight, another study with longer baseline and treatment recordings, of known bruxers with high sensitivity to caffeine and diagnosed as anxious, should be subjected to experimentation under different conditions for periods of at least 15 days each.

SUMMARY AND CONCLUSION

When compared to placebo, caffeine failed to be more effective in inducing increases in human masseter muscle nocturnal activity. Possible causal factors for that failure were discussed and more favourable experimental conditions were proposed. Δ

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TABLE III

RESULTS

Group I Placebo given first

Subjects	Period I		Period II		Activity			
	Duration	Frequency	Duration	Frequency	Duration		Frequency	
					Incr	Decr	Incr	Decr
1	30.34	12.98	23.44	9.2		X		X
3	279.83	144.95	415.73	88.33	X			X
5	32.18	12.00	41.04	23.88	X		X	
7	133.58	33.24	71.46	22.00		X		X
9	161.22	37.84	62.56	34.02		X		X
11	44.04	26.42	121.56	59.42	X		X	
13	172.96	36.9	125.7	27.04		X		X
Σx	854.15	304.33	861.49	263.89				
$\bar{x}$	122.02	43.47	123.07	37.69				
X^{on-1}	92.84	45.98	134.56	27.11				

TABLE IV

RESULTS

Group II Caffeine first

Subjects	Period I		Period II		Activity			
	Duration	Frequency	Duration	Frequency	Duration		Frequency	
					Incr	Decr	Incr	Decr
2	192.98	37.6	72.56	27.4		X		X
4	47.09	36.4	18.5	13.18		X		X
6	40.88	21.88	218.06	28.72	X		X	
8	74.68	37.54	48.92	19.84		X		X
10	79.00	53.9	47.36	32.56		X		X
12	174.00	77.07	106.72	42.05		X		X
14	5.2	3.86	8.84	7.44	X		X	
Σx	613.83	268.25	520.96	171.19				
$\bar{x}$	87.69	38.32	74.42	24.45				
X^{on-1}	70.02	23.11	71.28	11.83				

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TABLE V
Summary of Anova for Duration

Source of variation	S.S.	df	M.S.	F.	P
Total	232,860.	27			
Within subject	46,696.	14	3,335.	.7965	NS
Treatment effect	364.	1	364.	.0870	NS
Order effect	266.	1	266.	.0636	NS
Treat. and Order	0	1	0	0	
Error	46,065.	11	4,187.		

Summary of Anova for Frequency

Source of variation	S.S.	df	M.S.	F.	P
Total	22,530.3113	27			
Within subject	3,694.8918	14	263.9208	.9996	NS
Treatment effect	114.7771	1	114.7771	.4347	NS
Order effect	675.9109	1	675.9109	2.5601	NS
Treat and Order	0	1	0	0	NS
Error	2,904.204	11	264.0185		

TABLE VI
Stress Self Assessment
Group I

Subjects	Period I	Period II	Increase	Decrease
1	1	1	—	—
3	4	4.33	X	—
5	2.8	2.8	—	—
7	3.8	4.4	X	—
9	2.8	3.6	X	—
11	2.4	2.6	X	—
13	2.6	2.6	—	—
Σx	19.4	21.33		
$\bar{x}$	2.77	3.05		
χ^{2n-1}	.99	1.19		

Group II

Subjects	Period I	Period II	Increase	Decrease
2	2.4	2.8	X	—
4	2.4	3.6	X	—
6	3.8	3.4	—	X
8	3	4	X	—
10	3	3.6	X	—
12	2.8	3.5	X	—
14	2	2.2	X	—
Σx	19.4	23.10		
$\bar{x}$	2.77	3.30		
χ^{2n-1}	.58	.60		

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ZOVIRAX[®] OINTMENT 5% (4 g and 15 g tubes)

INDICATIONS AND CLINICAL USE: ZOVIRAX Ointment 5% is indicated for the management of initial episodes of genital herpes simplex infections. It is also indicated in the management of nonlife-threatening cutaneous herpes simplex virus infections in immunocompromised patients. The prophylactic use of this preparation has not been established.

In genital herpes, appropriate examinations should be performed to rule out other sexually transmitted diseases.

These indications are based on the results of a number of double-blind, placebo-controlled studies which examined changes in virus excretion, healing of lesions and relief of pain. Because of the wide biological variations inherent in herpes simplex infections, the following summary is presented merely to illustrate the spectrum of responses observed to date. As in the treatment of any infectious disease, the best response may be expected when therapy is begun at the earliest possible moment.

In immunocompromised patients, 93% were virus negative after 5 days of topical ZOVIRAX therapy, whereas only 35% of placebo recipients were virus negative at the same time.

In patients with herpes labialis, there was a significantly greater decrease in the amount of virus excreted after one day of therapy in those receiving ZOVIRAX within 8 hours of the onset of cold sores when compared to identically treated placebo patients.

Because complete re-epithelialization of herpes-disrupted integument necessitates recruitment of several complex repair mechanisms, the physician should be aware that the disappearance of visible lesions is somewhat variable and will occur later than the cessation of virus shedding. All immunocompromised patients who received topical ZOVIRAX had healed their lesions 23 days after the initiation of a 10-day course of therapy. 75% of placebo patients had healed lesions at that point. Some placebo patients continued to have visible lesions for more than 30 days.

Pain associated with herpes infections is highly variable in frequency and intensity. One hundred percent of the ZOVIRAX-treated immunocompromised patients were pain-free by day 23 versus 70% of placebo-treated patients.

Whereas cutaneous lesions associated with herpes simplex infections are often pathognomonic, Tzanck smears prepared from lesion exudate or scrapings may assist in the diagnosis. Positive cultures for herpes simplex virus offer the only absolute means for confirmation of the diagnosis.

CONTRAINDICATIONS: ZOVIRAX Ointment 5% is contraindicated for patients who develop hypersensitivity or chemical intolerance to any of the components of the formulation, such as polyethylene-glycol.

WARNINGS: ZOVIRAX Ointment 5% is intended for topical use only and should not be used in the eye or on mucous membranes.

PRECAUTIONS: The recommended dosage, frequency of application and duration of treatment of ZOVIRAX Ointment 5% should not be exceeded.

It is not known whether acyclovir is excreted in human milk.

Because many drugs are excreted in human milk, caution should be exercised when ZOVIRAX is administered to a nursing mother.

ZOVIRAX Ointment 5% should be used during pregnancy only if the physician feels the benefit will outweigh the possible harm to the fetus.

Safety of use of ZOVIRAX Ointment 5% in children has not been established.

There exist no data, at this time, which demonstrate that the use of ZOVIRAX Ointment 5% will prevent transmission of infection to other persons.

Since most cutaneous herpes simplex virus infections result from reactivation of latent virus, it is unlikely that ZOVIRAX Ointment 5% will prevent recurrence of infections when applied in the absence of signs and symptoms. ZOVIRAX Ointment 5% should not be applied in an attempt to prevent recurrences; application should commence only at the earliest prodromal sign of disease onset.

Although clinically significant viral resistance associated with the use of ZOVIRAX Ointment 5% has not been observed, this possibility exists.

ADVERSE REACTIONS: Because ulcerated genital lesions are characteristically tender and sensitive to any contact or manipulation, patients may experience discomfort upon application of ointment. In the controlled clinical trials, mild pain (including transient burning and stinging) was reported by 103 (28.3%) of 364 patients treated with ZOVIRAX Ointment 5% and by 115 (31.1%) of 370 patients treated with placebo. Treatment was discontinued in 2 of these patients. Other local reactions among acyclovir-treated patients included pruritus in 15 (4.1%), rash in 1 (0.3%) and vulvitis in 1 (0.3%). Among the placebo-treated patients, pruritus was reported by 17 (4.6%) and rash by 1 (0.3%).

In all studies, there was no significant difference between the drug and placebo group in the rate or type of reported adverse reactions.

SYMPTOMS AND TREATMENT OF OVERDOSAGE: Overdosage by topical application of ZOVIRAX Ointment 5% is unlikely because of limited transcutaneous absorption.

DOSAGE AND ADMINISTRATION: Apply ZOVIRAX Ointment 5% liberally to the affected area 4 to 6 times daily for up to 10 days. A sufficient quantity of ointment should be applied to adequately cover all lesions. A finger cot or rubber glove should be used while applying ZOVIRAX in order to prevent

- (1) autoinoculation of other body sites or
- (2) transmission of infection to other persons.

Therapy should be initiated as early as possible following onset of signs and symptoms.

AVAILABILITY: ZOVIRAX Ointment 5% is available in tubes of 4 g and 15 g. Each gram contains 50 mg acyclovir in a polyethylene-glycol base. ZOVIRAX Ointment 5% is for topical administration.

Product Monograph available on request.

Reference:

1. Whitley RJ, Levin M, Barton N, et al: Infections caused by herpes simplex virus in the immunocompromised host. Natural history and topical acyclovir therapy. *J Infect Dis* 1984;150:323-329.

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Treatment of Rapidly Progressive Periodontitis: A Review and Case Report

Vijay K. Pruthi, DDS Cert. Perio., Diplomate, American Board of Periodontology

Winnipeg, Man.

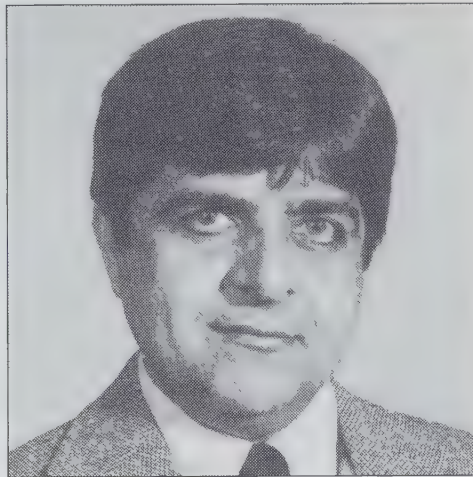
Steve A. Milman, DDS

Round Rock, Texas

There are at least six types of clinically and microbiologically distinct human periodontal diseases, including: 1) chronic gingivitis; 2) pre-pubertal periodontitis; 3) localized juvenile periodontitis; 4) chronic adult periodontitis; 5) rapidly progressive periodontitis; and 6) acute necrotizing ulcerative gingivitis/periodontitis.¹

Among these diseases, rapidly progressive periodontitis is poorly understood. It is highly destructive, and is most commonly diagnosed in adults between 20 and 35 years of age.² Females are affected more often than males (2:1 to 3:1).³ Clinically, there is hemorrhage, painful inflammation of the periodontal tissues, proliferation of the marginal gingivae, and exudation.² During the active stage of the disease process, there is rapid loss of alveolar bone, both horizontally and vertically, around the majority of teeth; increasing mobility and loss of teeth may be associated with the advanced stage. The lesions are generalized, and symmetrical patterns of disease may or may not be observed. There is minimal plaque, and generally a low caries rate has been reported. The disease may progress to tooth loss without remission, or may subside and become quiescent with or without therapy. During the inactive phase, the gingivae have a clinically normal appearance and may be tightly adapted to the roots of the teeth but yet have deep periodontal pockets with very advanced bone loss.² Rapidly progressive periodontitis can appear with or without either gingivitis or a history of juvenile periodontitis.

Some systemic conditions have been associated with rapidly progressive periodontitis. Increased incidence of respiratory tract infections, otitis media, skin and fungal infections and furunculosis have been reported,³⁻⁵ and other symptoms such as mental depression, malaise and weight loss have been observed.^{1,2} A significant percentage of these patients have not only depressed neutrophil or monocyte



Dr. Vijay K. Pruthi, DDS

chemotaxis, but also autologous mixed lymphocyte response.⁴⁻⁸ Genetic factors have also been associated with this disease.⁹⁻¹¹

The flora associated with this form of periodontitis is composed of Gram-negative bacteria, mainly *Bacteroides gingivalis*, *Bacteroides intermedius*, *Wolinella recta*, *Actinobacillus actinomycetemcomitans*, and *Fusobacterium nucleatum*.^{2, 12-14}

This article discusses the treatment of a patient who had a weakened periodontium due to rapidly progressive periodontitis. A systematic approach to preserve the periodontally compromised teeth is described. Results were evaluated and clinically maintained for one year.

Case Report

A 30-year-old Caucasian female teacher, married with two children, presented to the Periodontology Clinic with a chief complaint "my front teeth have been spacing and some teeth are loose". The patient's medical history was compiled by questionnaire and interview. She considered herself to be in good health and yearly visits to her doctor had been unremarkable. She reported an allergy to penicillin. There was no history of rheumatic fever, hepatitis, cardiovascular disease, diabetes or bleeding disorders. She had

been smoking two packs of cigarettes per day for the past 15 years. Blood tests were ordered, with the following results (laboratory normals in parentheses): CO₂ - 21 meq (22-30); triglyceride - 184 mg/dl (30-175); WBC - 11,400 (4,500-10,500); HGB - 16.3 g/dl (12.0-16.0); and HCT - 49.4% (37-49%).

The patient had regular dental check-ups while at high school but had had sporadic appointments since that time. She recalled that her anterior teeth had begun to shift noticeably by age 22. Her mother had few caries but had lost all her teeth by age 22 from severe periodontitis.

Intraorally, there were 27 fully erupted teeth. Alloy restorations were present on teeth 27 and 33. The facial of 27 had experienced recurrent caries and the distal of 37 was also carious. Teeth numbers 17, 18, 28, 38 and 48 were missing. Stain was apparent on many tooth surfaces. In total, 41/108 tooth surfaces harboured obvious plaque. The initial bleeding index was 87%. Occlusal examination revealed an Angle Class I molar relationship bilaterally. Group function was present on all posterior teeth and cuspids. Balancing contacts were present on teeth 16/46, 26/37. Fremitus existed on tooth 14, and teeth 12 and 16 were mobile during lateral movements of the mandible. There was no deviation, joint sound or limitation of mandibular movement during opening and closing. There were no TM disorders, and no history of bruxism or clenching was elicited. However, prominent wear facets were present on the posterior teeth. All teeth were vital to pulp testing.

Periodontal findings

All marginal gingival tissue presented with a purple-red diffuse erythema (Fig. 1), and nearly all sulci bled upon gentle probing. The gingival margin was generally coronal to the cemento-enamel junction except for 3-4 mm



Fig. 1. The pre-treatment clinical appearance. Note that the periodontal tissue is highly inflamed and purple-red. A diastema between teeth 11 and 21 can also be seen.

recessions on the palatal roots of teeth 16 and 26 and slight recession around the lingual of teeth 36, 37, 46, 47 and the facial of 12. Probing depths ranged from 2 to 10 mm in the maxilla and from 1 to 9 mm in the mandible. Teeth 14 and 16 exhibited Class III mobility. Teeth 11, 12, 15, 22, 35, 32, 31 and 41 all displayed increased mobility. Class II furcations were probed on 16 (mesially and distally), 26 (mesially and distally), 37 and 36 (lingually). Class I furcations were probable on teeth 16 (facial), 26 (facial), 37 (facial), and 46 (facially).

Radiographic Findings

There was moderate-to-severe bone loss around all teeth (Figs. 2-4). The anterior teeth had experienced an apparent 60% loss of supporting bone. The radiographic appearance suggested a horizontal pattern. Tooth 16 had extensive radiolucent areas around its roots, suggestive of a through-and-through furcation involvement. On the maxillary left side, the distal of 26 appeared to have a furcation involvement. The mandibular teeth had experienced a horizontal loss of support. Calculus was discernible radiographically. The distal of tooth 37 was carious (Fig. 4).

Diagnosis, Etiology and Prognosis

From the radiographic and clinical periodontal findings, the patient was diagnosed as having rapidly progressive periodontitis. This has been associated with mainly Gram-negative bacteria and host immune system defects. She also presented with several factors which were considered as co-factors in this disease process. These included trauma from occlusion, smoking and subgingival calculus. Since no predictable therapies exist and some of these cases progress and result in tooth

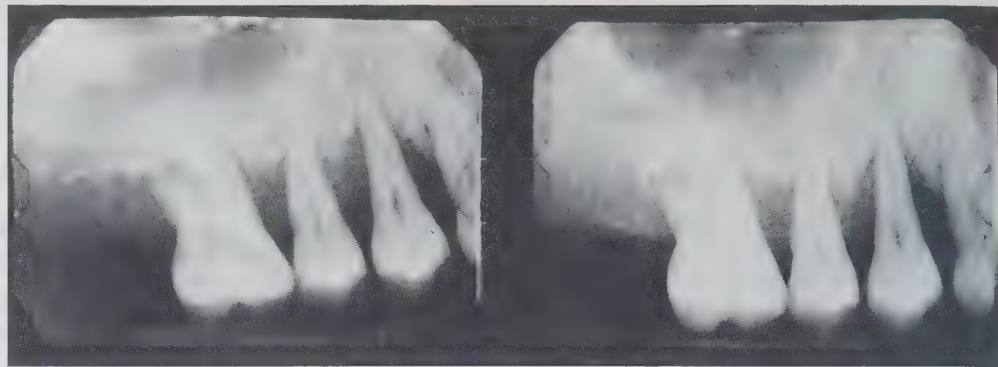


Fig. 2. Radiographic appearance before treatment. Note extensive alveolar bone loss on maxillary right posterior region.

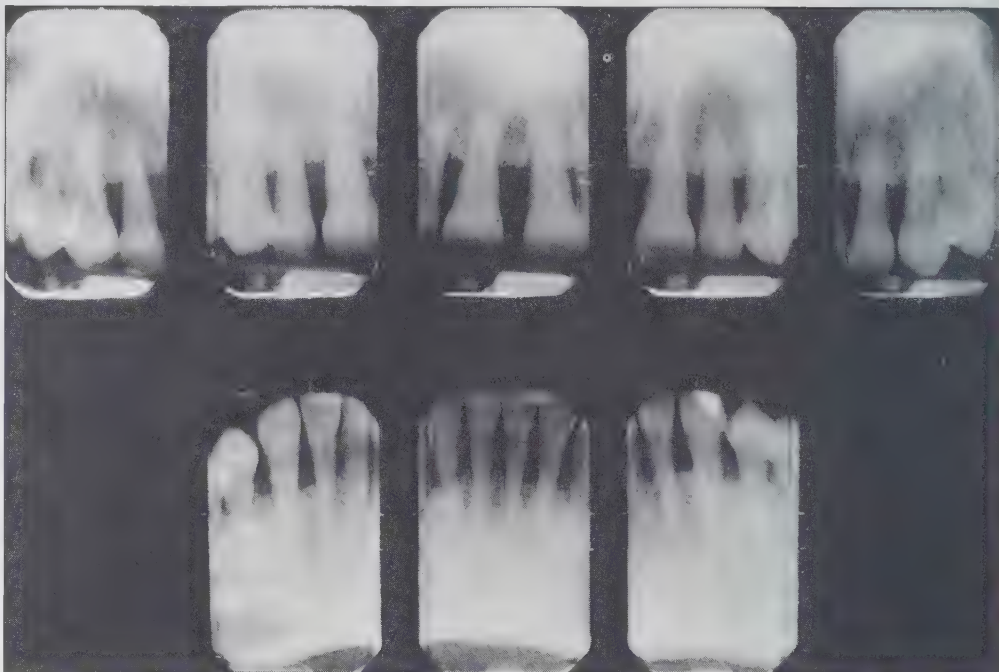


Fig. 3. Radiograph of maxillary and mandibular anterior region, displaying severe horizontal bone loss.

loss despite aggressive therapy, the prognosis for this case was considered guarded to poor.

Therapeutic Procedures

1. Initial Phase:

The initial therapy consisted of an explanation of the disease process and its prognosis, oral hygiene instructions which were reinforced at each appointment, meticulous scaling and root planing, stannous fluoride 0.4% topical gel application, and caries control. Scaling and root planing were initiated in the lower left quadrant. The patient was recalled four weeks later to assess tissue response and for additional root planing. At this visit, the patient presented with a highly inflamed, ulcerated area lingual to teeth 34-35 (Fig 5). She indicated that she had been in pain for two weeks following the first scaling and root planing appointment. Two sequestrae,

4 mm in length, were removed from this area. The patient was placed on tetracycline 250 mg q.i.d. for 21 days, during which additional root planing was accomplished without incident. The ulcerated area healed slowly over the next seven weeks. Phase 1 re-evaluation was done seven weeks after the termination of tetracycline therapy. The patient was highly motivated toward good oral hygiene, and many areas showed good tissue response. Most probing depths were reduced. However, there were persistent deep pockets that bled on mild probing, and the patient could not remove plaque in these areas in spite of excellent home care. Open flap surgical curettage was therefore decided upon, in order to gain access for thorough root surface instrumentation. To increase patient comfort during the surgical and post-surgical period, the decision was made to splint teeth 13-15 with light-cured acrylic. No surgery was indicated on



Fig. 4. Pre-treatment radiograph. Note the severe osseous defects associated with maxillary and mandibular left posterior teeth. Tooth 37 displays caries lesion and calculus is also evident.

the upper and lower anterior regions due to good gingival response to initial therapy and possible post-surgical esthetic problems.

2. Surgical Phase:

The patient had tetracycline coverage during all flap procedures. Modified Widman flap surgical procedures were done in all posterior areas with the same technique. Facial and lingual inverse bevel incisions were made lateral to the crest of marginal gingiva. Full thickness flaps were elevated and granulosomatous tissue was debrided. Osteoplasty was done to aid in flap replacement. No ostectomy was attempted. Soft tissue coverage of the interdental bone was accomplished in all areas. The maxillary right sextant contained a through-and-through furcation involvement on tooth 16 from all directions and a 4 mm deep circumferential defect around tooth 14 (Fig. 6). The maxillary left second

molar had extensive horizontal bone loss about the palatal root and a moat defect which extended into mesial and distal Class II furcation involvements.

Both mandibular sextants had a facial ledge of non-supporting bone and flat, horizontal bone loss lingually. Class II furcation involvement was present on tooth 37 lingually. No root resections were done. The flaps were sutured at the original level in an attempt to facilitate new attachment. A non-eugenol surgical dressing was placed and post-operative instructions were given. Dolobid 500 mg was prescribed, every 8-12 hours as necessary for pain control. Post-surgically, the patient was seen at weekly intervals for one month to monitor tissue healing and plaque control.

3. Maintenance Phase:

The patient has been recalled every six weeks for maintenance. She had been instructed in the use of subgingival



Fig. 5. The mandibular left lingual view reveals an ulcerated area around teeth 34 and 35.



Fig. 6. Surgical site of maxillary right posterior region depicting through-and-through furcation involvement on tooth 16 and in circumferential osseous defect around tooth 14.

irrigation with chlorhexidine within the furcation area of tooth 16. All sites were irrigated subgingivally with chlorhexidine during in-office visits. She continued to display acceptable oral hygiene. Maintenance appointments continued every six weeks for the first post-operative year.

Post-Treatment Findings

The response of the periodontal tissues to therapy was encouraging (Fig. 7). Bleeding and signs of inflammation were minimal. Following completion of therapy, the periodontium remained fairly stable for a year except for isolated 1-5 mm pockets. Since rapidly progressive cases have a propensity toward relapse, careful observation continued. The patient's chief complaint of mobility and shifting of the anterior teeth had only been partially addressed; tooth #16 was stable and #14 was mobile but tolerable by the patient. Anterior spacing was still present (Fig. 7). The possibility of orthodontics was considered but an appraisal by an orthodontist will not be made until the case remains stable for one year. Finally, the maxillary molars with furcation involvements will require meticulous debridement during maintenance. With ongoing care, these teeth may last for many years.



Fig. 7. At one year post-treatment. Note that gingiva is healthy and firmly adapted to teeth, and no teeth were lost.

Discussion

Rapidly progressive periodontitis is a distinct disease entity. Females are more affected than males, supporting either an underlying hormonal involvement or genetic implications in the disease process.¹⁵ Dental practitioners have a responsibility of alerting proband patients with rapidly progressive periodontitis of possible genetic transmission of the disease, and other family members may be affected by the same disease.¹⁵ It is a relatively rare form of disease when compared with the adult form of periodontitis. Nevertheless, it is important because patients lose some or all of their teeth at an early age, and treatment is complex and extensive.² It has been reported that patients with this disease who manifest defects in neutrophils, but do not have other systemic diseases, appear to respond well to the treatment.² The basic format of treatment consists of scaling and root planing and either open flap¹⁶ or closed curettage^{17,18} with meticulous daily plaque control; systemic administration of tetracycline 250 mg four times a day for a total of three weeks; and frequent maintenance. In these patients, advanced surgical procedures are often needed. Surgical procedures allow access to the root surface and granulomatous tissue, and result in shallower probing depths that are easier for the patient and therapist to maintain.¹⁶ In addition, administration of tetracycline, in conjunction with mechanical therapy, is considered beneficial.¹⁹ Tetracycline is the drug most extensively documented by clinical trials, and reports of its relative efficacy in supporting mechanical therapy of rapidly progressive periodontitis have been published.^{2,16-20} It has also been advocated that patients may require an average of about six to seven

maintenance visits during the first year to stabilize their periodontal health; thereafter, recall visits can be programmed to every three months.²⁰ The reports suggest that the disease is generally arrested by the treatment and those who stay in maintenance do well.^{17,20}

Ideally, microbiologic sampling, antibiotic sensitivity test, serological investigation, neutrophil and monocyte chemotaxis tests, and autologous mixed lymphocyte reaction (AMLR) tests could have been done and are suggested for this condition. However, for this patient, the diagnosis was made from clinical and radiographic findings only. No microbiological profile was done, and tetracycline was prescribed empirically. The combined tetracycline and mechanical approaches were taken to alter the suspected periodontic pathogens and to decrease the number of microflora that can then be tolerated by the weakened periodontium. However, one must be cautious about using this drug due to possible adverse side effects, including the development of resistant strains, organ toxicity, gastrointestinal disturbance, superinfections and hypersensitivity.¹⁹

Co-destructive factors such as occlusal trauma in conjunction with inflammation may have accounted for the rapid rate of alveolar bone destruction in this case. Occlusal adjustment could have been performed and is suggested when indicated. In addition, the smoking habit of this patient may have contributed as a co-destructive factor. The harmful effects of smoking on the periodontium have been reported, and sometimes smokers tend to heal slowly. It has been reported that salivary leukocytes' function is inhibited, and this may be responsible for enhanced plaque formation.²¹ Furthermore, the presence of toxins in the gaseous phase of tobacco smoke may inhibit chemotaxis function of peripheral blood leukocytes.²²

Surgery and more frequent recalls resulted in stabilization of this case. Since the surgery was performed prior to the increased recall, the positive effect could have been due to both of these procedures. However, one must be cautious about the interpretation of a short-term evaluation of this patient. At this point in time, we lack experimental data regarding the most efficacious methods of treatment, response to treatment, and understanding about the disease activity

in patients with rapidly progressive periodontitis. Δ

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Reprint requests to Dr. Pruthi.

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REQUIREMENTS

Applications in letter form must consist of a full description of the project or program, including a proposed budget and source of funding. All applications will be reviewed by the CFDE Management Committee in early 1991 and its recommendations will be subsequently presented to the Annual Meeting of the Board of Trustees for ratification. Applicants will be notified in writing immediately following the Annual Meeting in May.

For further information please contact:

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Announcements

October/Octobre 1990

October 1: Winnipeg Dental Society sponsored course: "Aerobics Program For the Total Well-Being" by Dr. Ken Cooper. Registration Fee \$75. Contact: Dr. Philip Poon (403) 942-2438.

October 3-6: Sarajevo, Yugoslavia. The Sixth Yugoslav Congress of Orthodontists. For information contact: Unis/Tours, Congress Dept., 71000 Sarajevo, Trscanska 7, or call: 071/202-072, 202-094. Telefax: 071/513-611.

October 10-11, 1990: Tenth Annual Bristol-Myers Squibb/Mead Johnson Symposium on Nutrition Research. "The Biology of Feast and Famine: Relevance to Eating Disorders" organized by the Departments of Nutritional Sciences and Psychiatry, University of Toronto, under a Bristol-Myers Squibb/Mead Johnson unrestricted research grant. For more information call Francine Gingras, Bristol-Myers Squibb, 212/546-4616; or Sharon Padua, Bozell Public Relations, 212/484-7415.

October 10-13: American College of Prosthodontists Meeting — Charleston, SC: For more information contact: Ms. Linda Wallenborn, 1777 NE Loop 410, Suite 904, San Antonio, TX 78217.

October 11: American Academy of the History of Dentistry Meeting — Boston: For information contact: Ms. Aletha A. Kowitz, 211 E Chicago Avenue, Chicago, 60611.

October 11: Academy of Dentistry International Meeting — Boston: For information contact: Dr. Henry J. Sazima, executive director, 5125 MacArthur Blvd, NW, Washington, DC 2006-3315.

October 11-14: Annual Meeting of the Canadian Pain Society (IASP Chapter) in London, Ont. Contact: Ms. Inese Kramins, Local Arrangements Committee, Dept. of Psychology, University of Western Ontario, London, Ontario, N6A 5C2.

October 12: ICCMO'S 4TH Annual Bernard Jankelson Memorial Lecture and 1990 Fellowship Convocation in Boston immediately preceding the ADA Annual Meeting. Dr. Joseph Konselman and Dr. Gerald Murphy, speakers. For information on registration, please contact the ICCMO International Headquarters, 830 Marsh & McLennan Building, Seattle, WA 98101, or call 1 (800) 446-1763.

October 17-21: American Society of Dentistry for Children — Meeting: For more information contact: Ms. Carol A. Teuscher, 211 E Chicago Avenue, Suite 1430, Chicago, 60611.

October 28-30: The Annual Meeting of the American Academy of Maxillofacial Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. Technicians and assistants, \$50; others, \$150. For more information contact Dr. Nikzad S. Javid, Chairman, International Relations Committee of the American Academy of Maxillofacial Prosthodontics, University of Florida, College of Dentistry, Department of Prosthodontics, Gainesville, Florida 32610-0435.

October 31-November 3: Annual Meeting of the Association of Prosthodontists of Canada in conjunction with the American College of Prosthodontists in Charleston, SC. Information may be obtained from Dr. Lawrence St. Pierre, Barrie, Ont. (705) 722-1104 or Dr. Brian Kucey, Edmonton, Alta. (403) 468-7270.

October 31-November 3: The Annual Meeting of the American College of Prosthodontics will be held at the Omni Hotel, Charleston, South Carolina, U.S.A. Technicians and assistants, \$50; others, \$150. For more information contact Dr. Gregory R. Parr, Executive Secretary and Treasurer, Department of Prosthodontics, Medical College of Georgia, School of Dentistry, Augusta, Ga. 309102-0200.

November/Novembre 1990

November 2-3: The Ontario Dental Association Symposium '90 — "Bridging the Gap", to be held in Toronto: For information contact: Professional Development, The Ontario Dental Association, 234 St. George Street, Toronto, Ontario, M5R 9Z9 or call the ODA at (416) 922-3900.

November 2-4: First National Congress of the Bulgarian Dental Association in Plovdiv, Bulgaria. For information, contact: Bulgarian Dental Association, 24 Veliko Tirmovo St., 4000 Plovdiv, Bulgaria.

November 6-9: The National Congress of the Israel Dental Association in Tel Aviv. For information, contact: Dental Congress 1990, c/o International Ltd., P.O. Box 29313, 65121 Tel Aviv, Israel.

November 16-18: Detroit Dental Review at the Hyatt Regency Dearborn. For more information, write the Detroit District Dental Society, 7430 Second Ave, Suite 420, Detroit, MI 48202 USA or call Marc Brown at (313) 871-3500.

November 19: TMJ Disorders — Differential Diagnosis, Treatment & Management by Dr. Terry Tanaka in Ottawa. Call: Ms. Bingham-McCrae at the Ottawa Dental Society at (613) 523-3876.

November 22: Toronto Academy of Dentistry, 53rd Annual Winter Clinic, Metropolitan Toronto Convention Centre, 255 Front St. W, Toronto, Ont. For information, contact the Academy of Dentistry at (416) 967-5649.

November 23: 41st Annual General Meeting of the Ontario Public Health Assn in Scarborough. Contact: OPHA, 468 Queen St. E, Toronto, Ont. M5A 1T7 Tel.: (416) 367-3313.

January/Janvier 1991

January 13-18: 23rd International meeting of Federacion Odontologica de Centro America y Panama (FOCAP) in Panama. FOCAP combines the membership of the 5000 members of dental societies in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama. Contact: Box 6777 Panama, 5 Panama. Tel.: (507) 64-3230.

January 17-20: Yankee Dental Congress Total Care Through Teamwork in Boston, MA. For more information, contact the Massachusetts Dental Society, 83 Speen St, Natick, MA 01760-4125 or call (508) 651-7511.

January 18: Dental Implants in the Restoration of Elementary as well as Comprehensively Involved Cases by Ralph A. Youdelis at the Fantasyland Hotel in Edmonton. For further information, phone (403) 434-2542.

January 20-27, 1991: The Barbados Dental Association is hosting its Third Annual Dental Mid-Winter Convention plus Maxillofacial and Craniofacial Surgery Symposium. For further information contact: Alison Hoad (Mrs.), Travel Connection, 3rd Floor Cave Shepherd & Co. Ltd., Broad Street, Bridgetown, Barbados, Telephone: (809) 431-2060. Fax (EO9) 431-2067.

January 24-25: Advanced Restorative Techniques sponsored by the Calgary and District Dental Society. Instructor: Dr. Alvin J. Fillastre. Fee: \$150. Contact: Dr. T. Smorang, 910-2303 4th St. SW, Calgary, ALTA T2S 2S7. (403) 228-7122.

January 26th-February 1: 26th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW. Tel.: 071-235-0788.

January 31-February 2: Miami Winter Meeting Committed to Progress at the Hyatt Regency, Miami. For additional information, contact the East Coast District Dental Society, 420 S. Dixie Highway, Suite 2E, Coral Gables, FL 33146 or call (305) 667-3647.

February/Février 1991

February 2-9: Update in Restorative Dentistry in Whistler, B.C. Sponsored by Dalhousie and McGill Universities. Contact: Alumni Affairs and Continuing Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5 or phone (902) 494-1674.

February 4: New Products and Materials by Gordon Christensen at the Westin Hotel in Edmonton. For further information, phone (403) 434-2542.

February 16-23: Virgin Islands Dental Association Convention in St. Thomas. For convention pre-registration and group travel and accommodation, please contact: Dr. Bob Brandon, 85 Lonsdale Dr., London, Ont. N6G 1T4 or tel.: (519) 657-3368.

February 17-20: 126th Midwinter Meeting of the Chicago Dental Society. Contact: Chicago Dental Society, 401 Michigan Ave, Chicago, IL 60611, USA. Tel.: (312) 836-7300.

March/Mars 1991

March 13-16: BC Dental Meeting at Vancouver Trade & Convention Centre. For further information, contact: College of Dental Surgeons of BC, 500-1765 West 8th Ave., Vancouver, BC V6J 5C6. Tel.: (604) 736-3621.

March 17-21: 26th Australian Dental Congress in Adelaide, Australia. For more information, contact: National Congress Office, P.O. Box 29, Parkville, Victoria 3052, Australia.

April/Avril 1991

April 6-13: 27th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW, England. Tel.: 071-235-0788.

June/Juin 1991

June 5-8: Medical/Hospitech 91 in Bangkok, Thailand. For more information, contact: SHK International Services Ltd., 23/F, 151 Gloucester Rd., Wan-chai, Hong Kong.

June 10-14: 2nd Iberian-Latin American Congress on Preventive Odontology & 2nd National Congress on Pediatric Odontology in Havana, Cuba. For more information, contact: Federacion Odontologica Latinoamericana, Calle 4, No. 407 entre y 19, Vedado, La Habana, Cuba.

June 14-17: The Third World Congress on Preventive Dentistry in Fukuoka, Japan. For information, contact: Secretariat of WCPD '91, c/o Dept. of Preventive Dentistry, Faculty of Dentistry, Kyushu University 61, Higashi-ku, Fukuoka, 812 JAPAN.

September/Septembre 1991

September 27-30, 1991: 13th Congress of the International Association of Dentistry for Children, Kyoto, Japan. For information contact the Secretariat, 13th Congress of the International Association of Dentistry for Children, c/o Japan Convention Services, Inc., Sumitomo Seimei Midotsuji Bldg., 4-14-3, Nishitemma, Kita-ku, Osaka 530, Japan.

Offices and Practices

BRITISH COLUMBIA—Central

Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work-week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472. (08-03/13)

BRITISH COLUMBIA—In the scenic south central interior, a 3-hour drive from Vancouver, and 1-hour drive from the Okanagan. A well-established, private family practice for sale, offering professional satisfaction and a sound investment opportunity. Computerized and recently renovated; independent evaluation available; opportunity to invest in dental building; will associate to ensure smooth transition. Ideal family community with excellent year-round recreation. Reply in confidence to CDA Box 2499. (10-6/12)

BRITISH COLUMBIA—Surrey: Well-established, recently-renovated office for sale in Surrey, BC, 25 minutes from Vancouver. Present doctor and staff willing to stay on to ensure smooth transition. \$250+ plus gross with low overhead. Please call Bus.: (604) 590-2522 or Res.: (604) 594-9630. (07-01/10)

BRITISH COLUMBIA—Victoria: well-established family practice for sale, located in a beautiful suburb of Victoria. Practice has a high gross-low overhead with a comfortable 4-day work week. Owner planning an early retirement for health reasons. This practice is located in the heart of some of the best fishing, sailing, golfing, and skiing in the world with a mild year-round climate. Please call: (604) 598-0809 or (604) 477-2565. (09-19/11)

BRITISH COLUMBIA—Vancouver: Enjoy the great West Coast lifestyle! Very busy, growing family practice for sale. High gross, 28-hour work week, shared office for great net. 3 modern, equipped operatories, with ceiling tv s, Exan computer system for 5 years. Not

inexpensive, but worth it! Serious calls only please. (604) 494-4303. (08-05/13)

BRITISH COLUMBIA—Vancouver:

Busy general practice for sale. Two-year-old office, 700 sq ft, two operatories, room for three, ceiling TV, Panelips, low overhead. Well-situated next to major tenant in shopping mall. Call Dr. P. Ng, office (604) 873-8117. (10-1/10)

BRITISH COLUMBIA—Victoria and

Gulf Island: Something different. 2 days a week in a children's hospital in Victoria. One day on each of two beautiful Gulf Islands. Great life style, low over-head, interesting work at a reasonable pace. Good gross. Call evenings, (604) 652-4970. (06-08/13)

ALBERTA—Central: Thriving dental practice for sale. Population 13,000. Excellent four-operator office in modern building. Call (403) 672-3033. (09-04/13)

ALBERTA—Edmonton: For sale. Busy, solo general practice in downtown area. Street level — excellent exposure, 2 operatories, practitioner returning to school. Exceptional gross income for 1989. High volume — active and new patients. Receptionist and assistant willing to stay on. \$150,000.00 FIRM Please reply to CDA Box 2496. (09-21/10)

ALBERTA—Edmonton: PRACTICE FOR SALE. Established general practice. Five operatories, central location, low overhead. Telephone (403) 422-2783 (days), (403) 467-6887 (evenings). (09-03/12)

ALBERTA—Fort McMurray: Oil resource capital of Canada. This is the one! Established 8 year general practice. Prime storefront location. State-of-the-art facility. Attractive due to constant modernization. Computerized ABEL/DYNA, 2700 solid patient profile, 760 sq ft, 3 identically-equipped operatories, 35 H/W with no extended hours, evenings or weekends yielding high average gross. Potential unlimited for 2 dentists + 2 hygienists utilizing facility 6 to 7 days per week.

AVAILABLE IMMEDIATELY: (403) 791-7400 B or (403) 743-1789 R. Dentist has moved to Nevada and does not want to continue commuting. (09-18/10)

SASKATCHEWAN: For sale or associateship leading to purchase of excellent, very high gross family practice in medium-sized city. Six operatories with 4 x-rays and panelipse. Please call (306) 782-1528 after 5 p.m. (09-02/13)

SASKATCHEWAN: Very busy, family-oriented practice for sale or associateship leading to purchase in small Saskatchewan city. Four fully-equipped operatories, including panelipse. Large patient base makes it suitable for 2 new graduates or 1 experienced dentist. Very reasonable selling price. Reply to CDA Box 2420. (08-04/13)

SASKATCHEWAN: Practice for sale. Large rural Saskatchewan practice for sale. Buyer to take overlease as purchase price. Excellent opportunity. Please write CDA Box 2483. (08-09/13)

MANITOBA—Winnipeg: Ultra-modern two-year-old dental practice in prime strip mall for sale. Excellent exposure, growing practice with new A-DEC equipment, great potential. Owner has accepted federal government contract. Contact business manager at (204) 832-0578 or write to 125 Sunnyside Blvd., Winnipeg, Manitoba R3J 3M1. (10-2/11)

ONTARIO—Etobicoke: FOR SALE. Long-established solo dental practice, very busy. Excellent opportunity for the right person. Owner is retiring. Please call (416) 845-3114. (07-04/10)

ONTARIO—Hamilton: General practice requires a full-time associate with plans to purchase. Located on a public transit in a modern medical complex. Good lease, 1200 sq. ft. Three fully-equipped ops., fiber optics, panelips, auto-developper, etc. Presently 4 days a week, plus hygienist 4 days a week, plus associate 2 days a week. 1700 active patients. An excellent opportunity for the person

who wishes to assume a full-time workload in a well-established practice. Present owner retiring due to health (arthritis). Please reply CDA, Box 2493.

(07-02/10)

ONTARIO — Ottawa Valley: Family practice for sale. Established 23 years. Owner retiring — will associate. Hospital privileges, low overhead, no assignment, low receivables. Excellent recreation. Two operatories, 900 sq ft — air conditioning. Reply to CDA Box 2498.

(09-17/10)

ONTARIO — Southwestern: Busy, established family practice for sale in small town near Lake Huron. Modern 30' x 50' building, air conditioned, two well-equipped operatories. Reception and business areas, lab, kitchen, bathroom, private office and staff room (or third operatory). Very competent, well-trained staff available with practice. Excellent income, low overhead. Please call (519) 482-5864.

(07-17/10)

QUEBEC — Montreal: Dental clinic and laboratory for sale. Two operatories. Private parking with or without building. Front metro. Good gross. Latin, Spanish, English, French, Greek, etc. clientele. Owner may stay to introduce buyer. Please reply to CDA Box 2494.

(07-18/11)

Associateships Available

NORTH WEST TERRITORIES — Yellowknife: Family practice requires an associate. Full book available in a busy practice located in a small northern town. Please send a resume to Box 2615, Yellowknife, N.W.T., X1A 2P9

(07-08/10)

BRITISH COLUMBIA: Busy practice in Central British Columbia, requires an associate to start October 1990. We have a modern facility, with Panorax, hygienist and a full support staff. We are seeking an enthusiastic and caring dentist to join this practice. Would suit a new graduate as well as an experienced dentist. Please call: (604) 583-6662.

(07-05/10)

BRITISH COLUMBIA — Victoria: One of Canada's most beautiful cities.

Associate required to take over existing case load and share new patients (approx. 140/month) in our total care, progressive practice. Large modern office currently has 3 dentists. Potential future partnership. Dr. Donald Bays Call collect (604) 381-6433 (w) or 595-8050 (h).

(09-05/11)

ALBERTA — Calgary: Excellent opportunity to associate in a group practice with 5 dentists and a part-time orthodontist. We are looking for a self-motivated, skilled and caring clinician with an outgoing personality. Our location is one of Calgary's fastest growing suburbs with a strong patient base and lots of potential for growth. The office has been professionally designed; all operatories have natural light and are fully-equipped with P&C chairs, A-DEC carts, Kabo handpieces and x-ray. We are up-to-date with all phases of debtistry, sterilization and asepsis. Inhouse lab for prosthetics and splits; C & B lab across the hall. Dentists and assistants perform all hygiene services. We have a topnotch computer system and an efficient staff to monitor production and collection. Reply in confidence to Dr. Dan Goldstein (403) 240-1023.

(10-7/13)

ONTARIO — Ottawa: Full-time associate required for busy, progressive office. Flexible hours, modern, family, preventative practice. Pleasant atmosphere, open concept. Located in Orleans, beautiful suburb of Ottawa. Please call (613) 824-7288.

(09-12/11)

ONTARIO: ASSOCIATE/PARTNER Opportunity exists with an exceptional staff to practice all phases of dentistry. Hospital privileges available. Located on the Trent River in scenic Campbellford. Call days (705) 653-2221 or evenings (705) 924-2864.

(09-15/13)

ONTARIO — Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent opportunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq. ft. Modern facilities in professional walk-in

medical-dental. Positions available June 1990. Call: (416) 452-7111.

(08-07/13)

ONTARIO — Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60 per cent associate percentage offered. Call (705) 522-4252.

(08-01/13)

ONTARIO — Toronto: Periodontist required for busy Periodontal office. Associateship leading to partnership. Please write CDA Box 2492.

(07-07/11)

ONTARIO — Woodstock: The Nix Team requires a full/part-time associate for our progressive dental office in Woodstock. We offer a new, state-of-the-art facility and the newest equipment. We focus on warmth, caring and expert communication with our patients. We value preventative and quality restorative dentistry. Please phone Dr. Garry Nix, (519) 539-9161, ask for Sheila.

(10-3/11)

QUEBEC — Montreal: Experienced Paedodontist seeks hospital position in Canada or international organization. Please write Dr. M. Marche, 3462 Cuvillier, Montreal, H1W 3B2, Québec.

(07-16/10)

NEW BRUNSWICK — Bathurst: Busy, established family practice for sale. Newly renovated office, 30 new patients per month with strong recall base. Owner leaving area and willing to negotiate price. Reply in confidence to CDA Box 2500.

(07-14/11)

NEW BRUNSWICK—Moncton: Busy, presentative general practice seeking a personable associate with a full range of clinical and patient communication skills. Talented, self-motivated individual will have excellent income and serious partnership opportunity. Please contact Dr. Fenton Smyth at (h) (506) 383-9032 or (w) (506) 857-4066.

(10-8/10)

Auxiliaries

ONTARIO — Toronto: Periodontist required for busy periodontal office. Associateship leading to partnership. Please write CDA Box 2492.

(07-07-10)

ONTARIO — Woodstock: The Nix Team requires a dental hygienist (expanded duty would be welcome) for our progressive office. We value preventative and quality restorative dentistry. Our team offers relocation expenses. We emphasize personal development through continuing education and full participation with other members of our team. Please send resume to: Dr. Garry Nix, 112 Springbank Ave., Woodstock, Ont. N4S 4Y3. ATTN.: Sheila.

(10-10/11)

Opportunities Available

BRITISH COLUMBIA: Dentist retiring. Full-time associate required with an option to buy in the immediate future. Busy practice located on East Broadway and Main in Vancouver. Call (604) 876-0712.

(10-4/11)

BRITISH COLUMBIA — Surrey: Excellent opportunity existing in extremely busy practice for the right individual who would like the team concept of dentistry. Please call Linda or Terrah to set up an appointment (604) 574-3522.

(09-14/11)

ONTARIO — North Toronto: Position available immediately for a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426.

(08-06/13)

QUEBEC: Bilingual periodontist looking for a part-time associateship in a periodontal practice in the Montréal or South Shore area. Two nights a week or Saturdays. For more information, contact Dr. C.D. Alleyn. Phone home (514) 347-4724 or work (514) 358-7274.

(09-08/10)

Vacation Rentals

BRITISH COLUMBIA — Blackcomb/Whistler: Luxury, 3-bedroom condo sleeps up to 8, walk to lifts. Call Dr. B. Clarke (519) 886-8980.

(10-5/12)

BRITISH COLUMBIA — Whistler/Blackcomb: Walk to village and lifts

from my super 3 bedroom + loft chalet! Stunning view, fully-equipped. Sleeps eight comfortably. \$300 per night. Minimum 3 nights. Call Dr. David Speirs (604) 874-3404.

(10-11/13)

BRITISH COLUMBIA — Whistler: Three-to-four-bedroom townhouse in Nordic Estates. Three baths, Jacuzzi tub fully-furnished with deck and barbecue. Available for nightly, weekly or monthly rental. Please call, Dr. Ed Murdock, (604) 736-5850 or Dr. Ken Phillips, (604) 433-5756.

(09-20/12)

MEXICAN RIVIERA — Ixtapa: Pacific ocean view, 3 bedroom villa, 2 baths, air-conditioning, private pool, golf and tennis. 6 star hotel & restaurant next door. Call (519) 426-9140.

(09-20/12)

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“Sanguine About Sanguinaria”

I read with interest the article by Hoover et al (*J Can Dent Assoc* 56:325-327, 1990) regarding the relative efficacy of sanguinarine and chlorhexidine on selected salivary microflora. The authors conclude that “additional longer-term studies such as those described by the ADA Council on Dental Therapeutics should be undertaken before any firm conclusions are drawn concerning the efficacy of sanguinarine.” We would like to draw attention to several studies conducted in accordance with ADA guidelines which address the effectiveness of *Viadent* toothpaste and oral rinse in clinical and microbiological evaluations.

- Two papers recently published by Harper and colleagues (*J Periodontol* 69:352-358, 1990; *J Periodontol* 69:359-363, 1990) present the results of a study which tested the clinical and microbiological effectiveness of *Viadent* toothpaste and oral rinse used in combination. Over six months of use, the sanguinaria products significantly reduced populations of *B. gingivalis*, *Fusobacterium sp.* and *Capnocytophaga sp.* compared to placebo. All clinical parameters measured (plaque, gingivitis and bleeding on probing) were also significantly reduced by the sanguinaria products compared to the placebo group.
- Research conducted by Kopczyk et al and presented at the 1990 IADR meeting in Cincinnati, Ohio, USA (*J Dent Res* 69: Abstract #1135, 1990) confirmed the findings of Harper. This trial evaluated two sanguinaria regimens compared to their respective placebo regimens, and established the efficacy of both sanguinaria regimens.
- Hannah, Johnson and Kuftinec (*Am J Orthod Dentofac Orthop* 96:199-207, 1989) tested the regimen use of sanguinaria toothpaste and oral rinse in a group of adolescents undergoing orthodontic treatment. Again, significant reductions in plaque, gingivitis and sulcular bleeding were observed for the sanguinaria group compared to placebo. Also of interest is that the placebo products were formulated with zinc chloride in concentrations which matched those found in the sanguinaria products, confirming the effectiveness of sanguinaria separately from zinc chloride.

What emerges from a review of these long-term trials is that the use of sanguinaria toothpaste and oral rinse in combination yields consistently positive antiplaque and antigingivitis efficacy.

Further, the effect of a sanguinaria oral rinse on aerobic and anaerobic bacteria found in dental plaque was also reported at the 1990 meeting of the IADR (*J Dent Res* 69: Abstract #1139, 1990). In this study, participants rinsed with the sanguinaria oral rinse, a placebo oral rinse, or chlorhexidine. Plaque samples were collected at 30, 60, 120 and 180 minutes after rinsing. The sanguinaria oral rinse produced a significant and prolonged reduction in total anaerobic microorganisms. The results obtained were statistically significantly better than those produced by the placebo oral rinse.

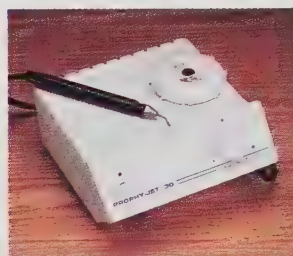
Based on the results of these and other clinical trials, we are satisfied that sanguinaria is effective in the reduction and control of plaque and gingivitis.

David I. Richardson, PhD
Vice President,
Research and Development
Vipont Pharmaceutical, inc.
Fort Collins, Colorado



"It's faster, easier on the patient, and I don't get as tired."

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PROPHY-JET® 30 Air Polishing Unit saves time and minimizes fatigue while polishing coronal surfaces and hard to reach pits and fissures. One study indicated that 94% of the patients treated preferred air polishing to hand instrumentation,

citing... more thorough stain removal... less chair time... more comfort (no heat, no scratching noise, no pressure of instrument against teeth).¹

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CAVITRON 3000 removes calculus faster and more efficiently than any other prophylaxis method. Plus, the Cavitron 3000 Unit has been proven to be less stressful and more comfortable than hand scaling.

"I would recommend the use of Air Polishing to all professionals who want to improve their efficiency and time utilization."

*Data on file at Dentsply/Equipment Division.

¹As published in Clinical Research Associates Newsletter, Vol. 5, Issue 10-October 1981.

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What's all the chatter about Trident with Xylitol?

There's been a lot of talk about xylitol lately. Like many other health professionals, you may have heard about it. But do you really know about it? Perhaps it's time you did.

Xylitol - more than just a sweetener.

Xylitol is, quite simply, a natural-source sweetener. However, extensive research conducted over the last decade shows that xylitol cannot be metabolized by decay-causing oral microflora. Therefore, xylitol does not promote tooth decay.

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Xylitol's distinctly pleasant flavour helps give Trident its great taste. What's more, xylitol also absorbs heat when dissolved in the mouth, producing a cool, refreshing sensation. No other sugarless gum in Canada tastes better. So when you recommend

Trident, you can be sure your patients will be pleased to comply.

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We invite you to order Trident sample packs for use in your own practice. And do some chatting of your own.

SAVE OVER 60%

- ☐ x Trident Assorted (Peppermint, Cinnamon, Freshmint, Fruit and Bubble Gum)
☐ x Trident Peppermint
☐ x Trident Freshmint
☐ x Trident Bubble Gum
- Each sample pack contains 10 boxes (180 packages of gum). Maximum order is 5 sample packs. The price of each sample pack is \$40.00 (a retail value of \$108.00).

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Send to the Trident Professional Plan, P.O. Box 490, Station A, Scarborough, Ontario M1K 9Z9. Please allow 4 - 6 weeks for delivery. Offer valid until June 30, 1991.

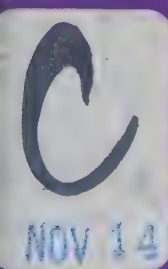


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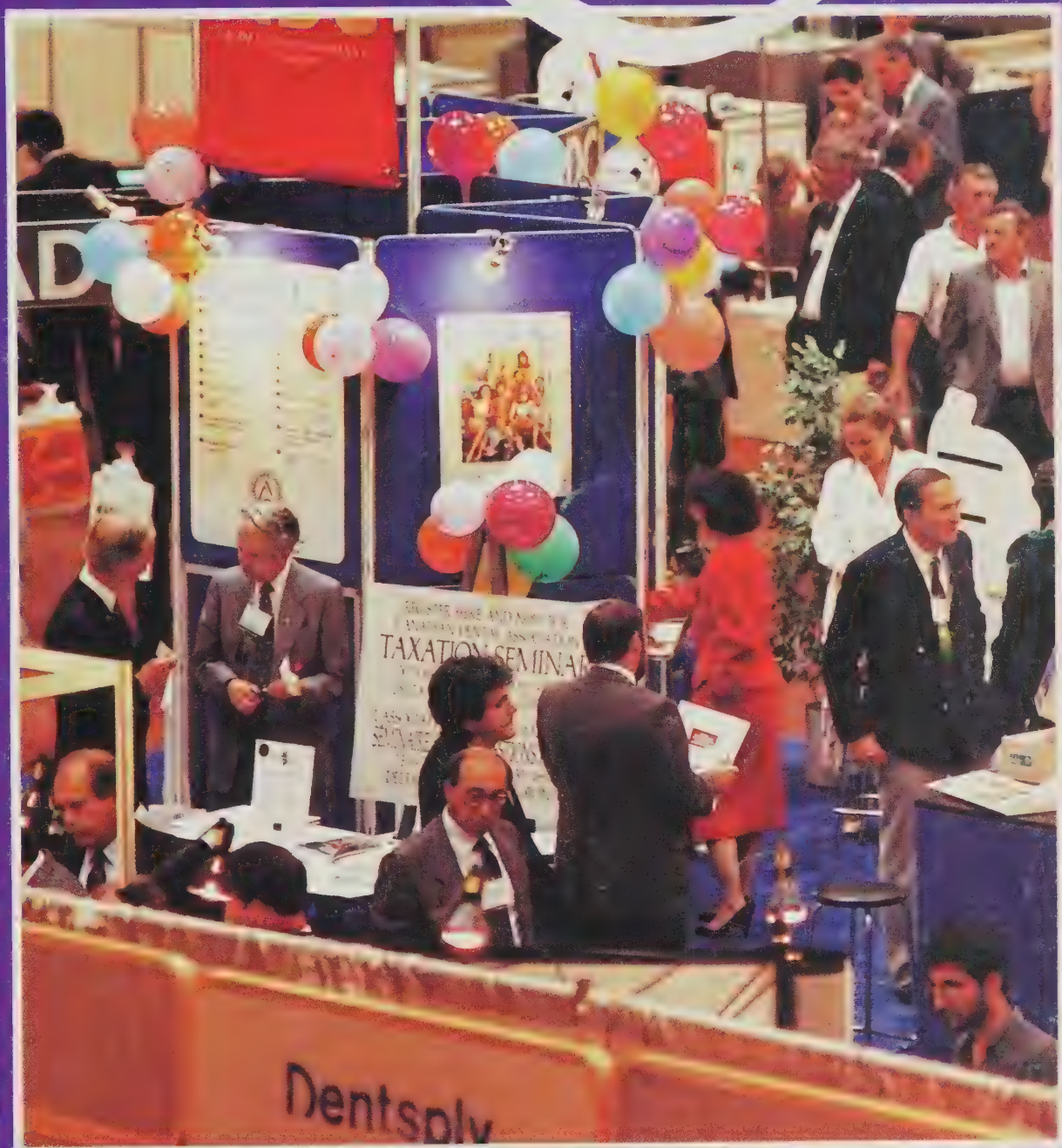
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▲ Congrès de l'ADC 1990

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DR A H WELCHER

The Equity Grant for the advancement of Dentistry

In recognition of its longstanding relationship with the dental professions in Canada, Ash Temple Limited has created the Equity Grant.

Designed to encourage and facilitate the development of clinical dentistry and continuing education in Canada, the Equity Grant will be funded by Ash Temple Limited.

During odd-numbered years, the Equity Grant will be distributed to Provincial Dental Associations. During even-numbered years, the Equity Grant will be distributed to Canadian Universities.

The 1989 Equity Grant was distributed to Dental Associations worldwide in early 1990. The individual Provincial Dental Associations will be proposing their share of revenues realized by our individual provinces in relation to national revenues.

As stakeholders in the Dental Community in Canada, we are proud to support the advancement of current technologies by supplementing international development through the advancement of dental technology with our

EQUITY UPDATE

In 1989, the Equity Grant provided \$50,000 to Dental Associations across Canada.

For 1990 Equity Grant will be providing \$50,000 to Canadian Dental Schools (to be awarded in 1991)

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November 1990

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CDA MISSION STATEMENT

The Canadian Dental Association serves the dental profession — and through the profession the Canadian public — as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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JOURNAL

Canadian
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Association

L'Association
dentaire
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November 1990

Vol. 56 No. 11

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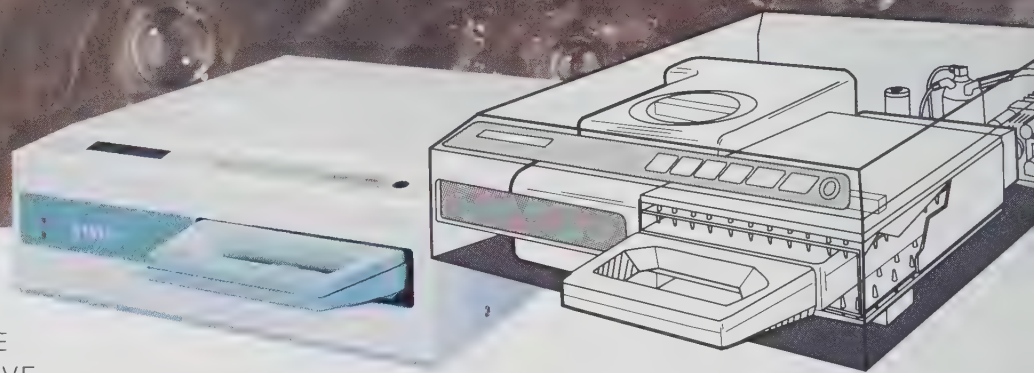


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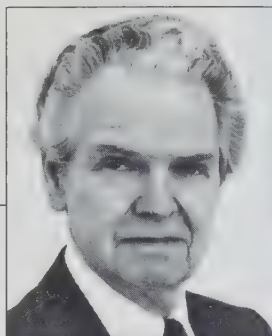
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Ethics — Just Words?

One of the topics of discussion at the CDA Board of Governors' August meeting was the new Code of Ethics. Committee Chairman, Dr. Jim Brookfield, received full endorsement from the Board for the Preamble and Introductory section of the Code. The Committee continues its deliberations.

The exercise is not new. The last Code of Ethics was revised in 1980 and by the time it was adopted it had achieved some sort of record. No previous item of business had come to the Board, was debated and tabled more often than the 1980 Code of Ethics. . . indicative of the trials and tribulations of finding the right words to say the right things.

At best — following its unenviable record — the 1980 Code was a compromise. Many deemed it a watered down document with very little substance. Precisely why, with changing times, circumstances and individuals, the Executive Council was encouraged to try again.

Dr. Brookfield's revitalized Committee has accomplished an exemplary achievement in a short period of time. In 1989, their "Patient's Charter of Rights" was enthusiastically received. Now the Code of Ethics is proceeding to finalization. But will new words and more words make a difference? Probably not!

Ethics and conduct require more than words — they require commitment. When God gave Moses the Ten Commandments on Mount Sinai, He required only 364 words. Jesus used only 93 words for "The Lord's Prayer". Yet the Preamble of CDA's Code of Ethics requires over 575 words! Just to guide a dental practice?

Nor is it any easier to teach ethics than place it in script. An article in the May 1990 issue of the Reader's Digest, "Can Ethics Be Taught?", by Michael Levin of City College of New York, warns, "don't count on the classroom for last minute lessons". Mr. Levin's concluding paragraphs are profound in their brevity. . .

"A complex world does present special moral puzzles, and there is certainly a place for philosophical reflection. But ethics courses are pointless exercises. Telling right from wrong in everyday life is not that hard; the hard part is overcoming laziness and cowardice to do what one perfectly well knows one should.

As every parent learns, only good examples and apt incentives can induce that strength."

A former dental faculty member recently remarked of his own experience in teaching ethics: He didn't feel it was a waste of time — just an impossibility. To quote: "There is complete justification to make dental students aware of dental jurisprudence and the regulations for conducting a dental practice. And we certainly need to emphasize the consequences for misdemeanour. However, if young men and women did not learn ethics at their mother's knee it is too late for me to teach them now".

Should Dr. Brookfield and the Ethics Committee abandon the project and throw up their hands in despair? Certainly not! We encourage them to hang in; to bring down the best Code possible.

For the few dentists who walk with angels the new Code will augment an already perfect life. For the great majority it should shine as a beacon beckoning on to greater accomplishment. For the pitied minority who have a problem telling right from wrong, may the "new" Code of Ethics be the strength that helps them to discern the difference.

P. Ralph Crawford, BA, DMD

Editor: the Journal of the Canadian Dental Association

President's Column



Project Highlights

CDA Convention time is always exciting for incoming Presidents. Augment the Convention with a multitude of meetings — the Board of Governors, Executive Council, Management Committee, CDA corporate bodies, auxiliary associations, (and on, and on) — the new President is very quickly initiated into the heavy tasks awaiting in the next twelve months. There is considerable strain during that entire last week of August but fortunately the tremendous support generated by the enthusiasm of all participants lightens the burden.

The annual Board meeting is the culmination of all the activities of more than twenty CDA councils and committees — thousands of hours of endeavour by hundreds of volunteer dentists — each with a common goal. Numerous projects dealing with improvements of services for profession and public were discussed and approved. I want to highlight a few of the many important decisions.

CDA's position on the GST is a prime example of a common goal. CDA's aim is to serve the interests of all Canadians, assuring access to dental care. Nor does CDA ever cease to serve the interests of the profession. Dr. Bob Hicks' Taxation Committee continues to work closely with Revenue Canada on various interpretations of the GST to diminish any negative impact on our practices. Watch for the comprehensive GST brochure distributed soon to every CDA member.

EDI is one of CDA's single biggest undertakings. The program is more than processing dental claim forms — it places each of us in a position to better manage an effective information system. The Board of Governors, respecting regional representation, approved a new structure for the responsible management of the entire EDI system.

Research will always remain a priority of CDA. A new Sub-Committee on Professional Resource Utilization was established. This Committee will review all available data and existing models to determine the supply and demand of future dental services. A group of experts will create a comprehensive and dynamic model to determine base-line data for a policy on dental research.

I believe professional ethics are crucial. I was proud of the leadership role exemplified by our Board of Governors when it approved not only the bold Statement of Principle on advertising, but also the Preamble to a new Code of Ethics.

It has been a long two years for the ad hoc Committee on the Certification of Dental Specialists but their recommendations received full Board approval. Their review and development of specialty certification lays the foundation to fulfill future provincial and national requirements in a very vital area.

As long as anyone can remember, CDA has promulgated information on the safety and effectiveness of various dental materials and devices. The profession and the public have come to expect CDA's leadership role. This meeting was no exception. Approval was given for a Statement of Principle on lasers in dentistry as well as the development of new recognition programs for rubber gloves and anticariogenic food products.

An extremely important new service is offered to CDA members — a monitoring program for sterilization equipment. For a small annual fee members can regularly determine the effectiveness of autoclaves maintaining a chain of sterility. CDA is very appreciative of the Oral Biology Department at the University of British Columbia's Faculty of Dentistry for making this infection control measure available.

No CDA Board meeting is ever complete without recognition of financial accountability. Again, your organization has proven its stewardship and accountability. The fiscal year ended well within budget with a modest excess of revenue over expenses.

Finally, the 1990 Ottawa Convention was a resounding success. There was something for everyone. We didn't hear of a single incident where any one of the 4,000 dentists, hygienists, assistants, technicians and guests went home disappointed. Lecture rooms were busy, exhibit halls buzzed and the social events bounced with conviviality. I extend, on behalf of all, sincere thanks and appreciation to Dr. Michel Jahjah and his team for their hard work, dedication and tenacity. Without them, no convention would have been possible.

*Gilles Dubé, DMD, MSc. Adm. Santé
President of the Canadian Dental Association*

EDI: Fact vs Fiction

Electronic data interchange has generated a great deal of dialogue and debate in recent months. While CDA has always encouraged healthy and lively discussion on the issues facing the profession, many of the comments and criticisms about CDAnet, dentistry's own EDI system have been founded on inaccurate and flawed information. Instead of resulting in a healthy and probing exercise on the value of EDI for dentistry, these discussions, and their resulting letters and magazine editorials, have produced misleading and sometimes damaging statements. Such commentary harms not only organized dentistry, but individuals who have spent countless hours in defence of the profession's principles and independence.

Let's take an honest look at some of the misconceptions about CDAnet.

1. Why bother about CDAnet? All we have to do is install fax machines.

On the average working day, with 18,000 dentists and hygienists rendering treatment, 144,000 claims may be submitted; that's 10 to 14,000 paper claims **per hour**. All of this data must be entered into the insurance company's computer in order to be processed.

Those insurers that carry 10% or more of the dental claims business (and there are quite a few) will be overburdened by such volume. Faxed claim forms will accumulate and simply pile up on a clerk's desk.

CDAnet is a highly efficient method of dealing with a large number of claims for the benefit of all participants: dentists, patients and insurance companies.

2. Dentists will be forced to purchase a computer.

The essence of CDAnet is choice. No one should automate an office solely to participate in CDAnet. The decision to computerize an office should be based on sound judgement and research. CDAnet is one more benefit to be weighed in this decision-making process. Moreover, under insurance law and industry conventions, paper claims will remain an option for Canadian dentists. CDA will protect this freedom of choice.

3. Dentists will be required to enter all the necessary data for each and every transaction.

Is this such a bad idea? Some of you are currently computerized. Some of you have a "One-Write" system. Needless to say, both systems require every transaction to be recorded. By using a computer, employees enter the data only once. It is then stored appropriately in the computer files. When needed, a transaction can be printed or transmitted by CDAnet. Thus the data is entered only once no matter how many transactions follow.

True, the initial entry issues from the dental office, but this would have to happen in any case. It is also true that this serves as the insurance companies' data entry. And it's true that insurers save some money by having dental office staff enter the data: it also saves everyone time.

It may seem strange, but we, as practising dentists, believe that insurance companies shouldn't be regarded as our natural enemy. They are part of the oral health care delivery system that attracts patients to our offices. In addition, with over forty insurance companies competing for dental business in this country, competitive forces are bound to result in savings to plan purchasers. Hopefully, this too will bring even more patients into our dental offices.

Guest Editorial

4. EDI will lead to assignment.

Is it not equally true that "paper claims lead to the assignment of benefits"? Based on their own individual circumstances, dentists decide whether or not to accept assignment. Some of you have chosen not to accept assignment; others have decided differently. It's common sense to assume that freedom of choice will continue under an EDI system.

5. EDI doesn't save the dentist time.

By using CDAnet, office staff will have to enter data once only. They can enter and upgrade patient records, and as part of this single procedure, transmit claim forms to insurance carriers. Staff will be better able to manage their time and resources. Also, we estimate that CDAnet will save both mailing and data entry time by at least three days in either direction: time will indeed be saved. Claims will arrive in an appropriate form at the insurance company, data will have been already entered into their system, and processing can begin. Currently, many of your patients are paid in 10 to 14 days. CDAnet should reduce that time by 30 to 50%. Surely, this is a service that many of you would like to offer your patients. Wouldn't you also like to hand them a settled claim form right in your office, minutes or seconds after a service has been rendered?

6. EDI benefits only insurance companies by saving them postage, data entry costs, etc.

No mention is made of the fact that insurance companies will pay all of the costs of the CDAnet system. If a dental office is computerized (and remember, that's your choice), there are no CDAnet costs to the dentist. If insurance companies save, then ultimately plan purchasers will save as well, and that's good news for all of us.

7. The dental associations will make a fortune, won't need members any more and are in collaboration with the insurance companies, etc.

Nothing could be further from the truth. The truth is, CDA and the provinces will share 15 cents per claim between them for two years, 10 cents per claim in the two years thereafter. CDAnet is expected to grow slowly over the first three years to the point where it will process 50% of the claims in Canada. This means that CDA will get its investment back and perhaps a small return — BUT NOT MILLIONS.

Members are the life-blood and the *raison d'être* of any professional association — especially CDA and the provincial corporate bodies. To suggest otherwise totally derogates their existence.

Yes, let's take an honest look at some of the issues concerning CDAnet. Let's debate them fairly and in a forum where the facts are known. And let's also allow dentists across Canada to make an informed choice about what's right for them. To do otherwise is an injustice to us all.

Management Committee, CDA

Dr. Gilles Dubé, President

Dr. Les Allen, President-Elect

Dr. Bernie Dolansky, Vice President

Dr. Kevin Roach, Past President

Convention Update

The 1990 committee
They did it all for you!



The 1990 Ottawa Convention will be remembered as the year of the Opening Ceremony, the expanded scientific program and free admission for CDA members. It was a success in many respects. More than 4,000 delegates attended, including 1,455 dentists.

To those dentists, spouses and dental team members who joined us in Ottawa, on behalf of the 1990 Convention Committee, thank you for your support — it is valued and appreciated. Your interest and commitment to CDA Conventions made the long days, sleepless nights and countless hours of preparation well worth all the effort.

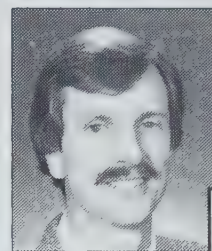
To those who helped to organize the Convention — including the many local dentists who volunteered to act as Presiding Chairpersons,

the youths who worked as facilitators, and the many individuals who assisted on-site to ensure numerous details were not overlooked — a hearty thank you. We couldn't have done it without you!

To all the exhibitors who were with us in Ottawa, a hearty thank you to you too! You put on a great show and are to be commended for creating a warm and friendly environment and offering attractive and professionally-designed exhibit booths. CDA Conventions will continue to work hard to attract more and more participants to the Annual Convention.

To all our sponsors, who through their generous contributions made it all possible, thank you.

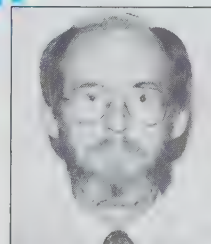
To all the draw winners — congratulations!



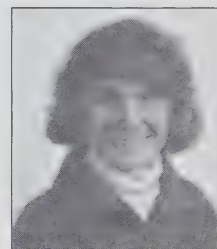
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Scientific



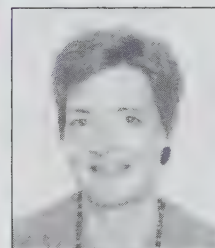
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Ian McConnachie, DDS
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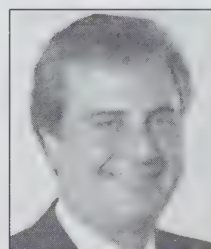
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1991

August
24-28
août

Convention Update

THE CANADIAN
DENTAL ASSOCIATION
CONVENTION IS A

TIME TO
LEARN!



The 1990 Convention – the "Year of the Speakers".
Forty-five renowned lecturers and clinicians had a topic for
everyone.



Marion Balla, Ottawa: "Effective Communication
Between Staff and Clients in the Dental Environment".

Convention Update



Now this is really a "hands-on course"!



Dr. Irvin Roseman, Wilmington, North Carolina, leads workshop participants of "Endodontics in the 90's".



"Have you ever seen anything like this before?"



Discussion following Major Paul Demers' (right) lecture, "Oral and Maxillofacial Infections".

Convention Update

The Canadian Dental Association is a

TIME OF HONOR



Dr. Kevin Roach, officially installs Dr. Gilles Dubé, CDA PRESIDENT, 1990-91.



CDA AWARD OF MERIT.
Executive Director, Mr. Jardine Neilson, congratulates Dr. Bruno Martinello, Edmonton, left, and Dr. Donald Gutkin, Winnipeg, right.



DISTINGUISHED SERVICE AWARD WINNERS.
From left to right: Dr. Louis Bernier, Sillery, Quebec; Dr. Don MacFarlane, Vancouver; Dr. George Peacock, Saskatoon.

Convention Update



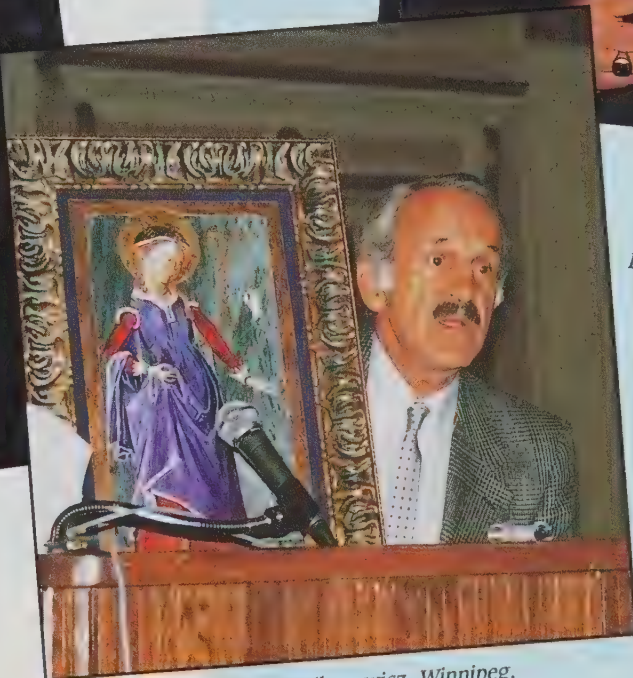
HONOURARY MEMBERSHIP.
 "For Outstanding Contributions to Dentistry", from left to right: Dr. Ernest Ambrose, Saskatoon; Dr. Roderick Moran, Toronto; Dr. Bradley Holmes, Kenora.



Dr. Ralph Crawford, Journal Editor, presents Dr. Roach with a personalized bound copy of "The President's Column".



SPECIAL FRIEND OF CANADIAN DENTISTRY,
 Mr. Burton Borgelt, Chairman of the Board and Chief Executive Officer of Dentsply International.



"I'm Grateful" Dr. Taras Snihurowicz, Winnipeg, honours Canadian dentistry and his adopted country with "Apollonia", the patron saint of dentistry.

Convention Update

The Canadian Dental Association Convention is a

TIME TO WIN!



"And the winner of the Chrysler Sundance donated by Aurum Ceramic Classic/Dental Lab is, Ms. Paula O'Riordan, Ottawa". Watching Dr. Roach and Dr. Dubé read the entry is, on the left, Mr. Hyo Maier, President of Aurum Ceramic and Dr. Michel Jahjah.

Convention Update



Exhibit attendance prizes for the winners of 2 colour TV's, 2 home video cameras and 2 Compact Disc players, courtesy of ASH TEMPLE/SERVIDENT. Present are, left to right, Mr. Cy Elborne, Dr. Kevin Roach; Mr. Michael Hart, President of Ash Temple; Mr. Gary Jarvis and Dr. Michel Jahjah.



Dr. Gilles Dubé draws the entry of Dr. William Coulby of Timmins, Ontario, for Air Canada's ticket for two anywhere Air Canada flies.



Mr. Luc Boulianne, HEALTHCO/DÉPÔT DENTAIRE, assists in selecting the winners of the Brainteaser Quiz. The winners were: Mr. Sandy MacDonald, Kincardine, Ontario; Ms. Lydia Lechter of D.D.O., Quebec, and Dr. David Ross, Ottawa.

To all the draw winners — congratulations!

Ms. Paula O'Riordan of Ottawa, winner of the Chrysler Sundance donated by Aurum Ceramic/Classic Dental Labs. Dr. William Coulby of Timmins, Ontario, winner of the Air Canada trip for two. Other winners were: Dr. Donna Witter, Ottawa; Dr. Nina Maron, Scarborough; Dr. Bert Maurice, Calgary; Dr. Edward Lechter, Montreal; Ms. Anne Langlois, Pembroke, and Mrs. Catherine Novak-Anderson, Orleans.

Convention Update

THE CANADIAN DENTAL ASSOCIATION CONVENTION

HAS



CDA BOARD OF GOVERNORS
Steering a course for another year.



**THE MURRAY McDONALD
MEMORIAL LECTURE**
Dr. Ted Ramage, Chairman of CFDE and
lecture sponsor, enjoys a laugh with
Mike Duffy, the 1990 guest speaker.



THE EXHIBITS

SOMETHING FOR EVERYONE!

Convention Update



Dr. Kevin Roach poses with two distinguished guests: President Malcolm Overbey, of the American Dental Association, and President Brian O'Loughlin of the Irish Dental Association.



"We're proud of you, Gilles!"
Dr. Gilles Dubé, his wife Lucette and daughters Geneviève and Marie-Hélène, with relatives and friends during the Installation Ceremony.



"This won't hurt a bit!"
Hepatitis B Vaccine Clinic sponsored by Smith Kline & French Canada Ltd.



CDA/DENTSPLY STUDENT CLINICIAN PROGRAM

Seven dental students received an all-expense paid Ottawa trip to represent their schools in the 20th annual competition. Left to right: Terry Wong, University of Manitoba (2nd PRIZE); Garth Von Hagen, University of Saskatchewan; Russell MacSween, Dalhousie; Lesli Hapak, Western Ontario (1st PRIZE); Barouyr Toukhmanian, Université de Montréal; Mark Shuren, McGill University; Dirk van der Meer, University of British Columbia.

Convention Update

The Canadian Dental Association Convention is a

TIME TO ENJOY!



Mrs. Lucette Dubé, wife of President Gilles, shares the joy of the Opening Ceremonies with their two charming daughters, Geneviève and Marie-Hélène.



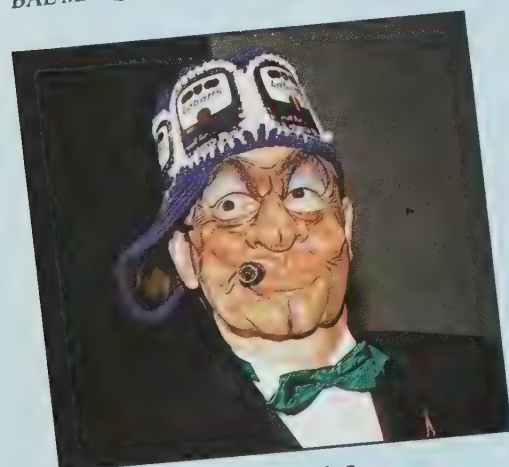
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Mr. Ian Stobart, President of Wrigley Canada Inc., welcomes the Bedfords of Ottawa to the President's Installation Ceremony.



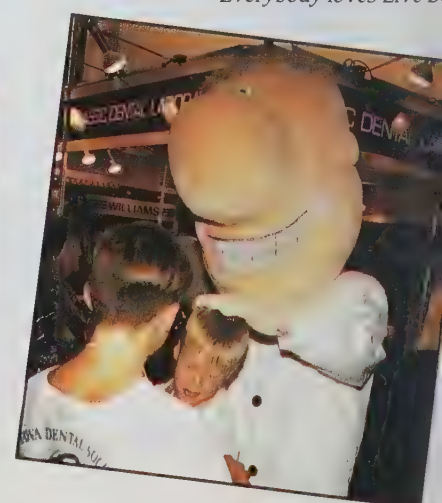
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CANADIAN DENTAL ASSOCIATION

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Mr. Ian Riehl, Partner, Riehl & Associates

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CDA Membership: A Wise Investment



Whether your affiliation with CDA is through your provincial association and/or licensing body, or whether your commitment to your national organization is made on a direct, individual basis, the connection is a well-considered, and — we hope — deeply felt one. Membership isn't so much sending in financial support as it is reaffirming one's belief in the value of co-operative and collective efforts towards a common goal. That's why it's important that every dentist in Canada support CDA.

Within organized dentistry, there are issues that are dealt with by our local societies, and there are issues that our provincial associations and licensing groups are empowered to handle. Other issues exist within a broader context, however, and require the resources and vision of a national organization. This broader vision identifies and defines an agenda of priorities that needs to be managed for the benefit of all dentists across Canada. Taxation, national health care policies, Federal Government liaison, dental awareness and third party relationships all require attention, leadership and direction.

CDA's strength is in its national perspective on issues affecting the dental profession. Its strength is its ability to represent all dentists on issues of national concern, and work towards achieving national consensus. Its *unique* strength lies in its resources and in its expertise, expertise recruited from among the best of Canadian dentists.

In recent months, CDA queried its members about how they view its activities and progress. A full two-thirds of respondents reported that the CDA is doing a better job today than it was three years ago. There is almost perfect congruity between what dentists believe CDA should be doing and the programs the Association executes. And support is strong for CDA to continue serving as the national voice of dentistry. Over 60% of those who replied felt that CDA was doing more for Canadian dentists, providing more services, and carrying out its mandate more effectively.

Over the past year, CDA has been active on two fronts: serving the needs of member dentists across Canada, and acting, on behalf of dentistry, to address the issues and challenges that impact on the profession.

EFFECTIVE REPRESENTATION

The results of CDA's work on behalf of dentistry in 1989-90 are far-reaching. Some have a direct bearing on the financial well-being of practitioners such as reducing the burden of the GST on dental services and increasing RRSP contribution levels. Due to the efforts of CDA, virtually all dental services were declared exempt under the GST, except elective cosmetic dental services and some professional services such as court testimony, etc. Decisions by Revenue Canada in 1990 — the result of further lobbying by CDA — provide for GST refunds on supplies related to crown and bridge and orthodontic devices. In addition, application of the GST to existing equipment leasing arrangements will be delayed until 1994. All of this means that the GST will increase the cost of dental services by an estimated 2.5%, compared to the 7% expected by other service industries. CDA is currently preparing a GST manual on dental practice that will be available to members by early December. By acquiring exempt status, dentistry has ensured that dental services will continue to be as accessible after implementation of the GST as before.

CDA's liaison with the Federal Government on the GST is only one example of its ongoing representation of the dental profession on issues that affect us nationally. Over the past few years, there has been a number of notable achievements, many of which have far-ranging effects on the practice of dentistry. Among them was CDA's successful lobby to allow increased RRSP contributions by self-employed professionals in graduated stages over a period of five years. In 1991, you will be able to allocate up to \$11,500 to an RRSP fund; this limit will extend to \$15,500 by 1995. Dr. Bob Hicks, Chairman of CDA's Taxation Committee, was key in upgrading the RRSP maximums and in co-ordinating the work of the professionals' consortium that lobbied for it.

Other activities — like the development of an electronic data interchange system for dentistry and implementation of a uniform system of codes and list of services — promise greater efficiency and economy in the business of dentistry in the near future.

PRODUCT SAFETY AND STANDARDS

New recognition programs for both consumers and professionals will assist those seeking effective products. CDA's Consumer Product Recognition Program was expanded to include products effective in controlling gingivitis in addition to the fluoride dentifrices and mouth rinses already recognized. As 1990 draws to a close, the number of products holding the CDA Seal of Recognition and Statement based on scientifically proven efficacy, totals seventeen. In a similar effort, a new Professional Products Recognition Program was launched that allows for CDA recognition of professional materials and devices that meet the standards of the International Standards Organization (ISO).

MORE MEMBER BENEFITS

New this year, benefits such as a car leasing program and an equipment sterilization monitoring program (see *Communiqué*, October '90), provide added value to belonging to dentistry's national organization. These are in addition to the well-known roster of benefits available to CDA members at reduced rates, such as: informative public education materials for your patients, a gold Mastercard program, and CDA's valuable and unique Library/Resource Centre. In 1990, CDA's Library/Resource Centre expanded in response to demand. Its physical space has been doubled, nine new journal titles have been added and a new video library is being developed. The library now also provides a medical-scientific data base — BRS — allowing easy access to national and international research.

SPEARHEADING CHANGE

CDAnet, dentistry's national information network, will be operational in 1991. Its aim is to facilitate the electronic transmission of insurance claims from the dental office to the insurance carrier. It's a no-cost system developed by dentists for dentists in conjunction with the insurance industry and software vendors. CDAnet places the information that drives your dental practice under your control and your profession's. It makes today's technology practice-friendly and assures your professional self-determination for the future. Eventually, there will be a whole shopping list of services available through CDAnet, such as access to library and banking facilities, and the on-line purchase of dental products and equipment. These are only a few of the goals CDA has achieved for the benefit of all of us lately. CDA is also

- revising the Code of Ethics to better meet today's needs;
- developing guidelines and policy statements on topics such as lasers, professional and institutional advertising, mercury toxicity, and artificial tooth whiteners;
- continually reviewing current guidelines on infection control and the latest scientific evidence in the field to ensure that our own safety and that of our patients is protected;
- liaising with dental hygienist and assisting groups to establish a national certification examination for greater portability of auxiliaries from province to province, . . . and the list goes on.

The achievements of the past year are a testament to the fact that CDA has become a better, stronger, more dynamic and effective organization.

The Canadian Dental Association is continually being challenged to deliver the leadership and service you expect. The successes of '89-'90 confirm, once again, that we can and do deliver when your support is solidly behind us. That support is the springboard of the progressive, forward-looking work we carry out on behalf of dentistry and the practitioners of today and tomorrow. Conviction, support, and commitment: that's what an investment in CDA membership really means.

SERVICE

CDA remains very much a service organization. In the last year, service programs have been augmented and expanded to benefit the membership.

Communications

Enhanced communications programs, including the more frequent publication of the CDA *Communiqué* — the members' newsletter — and the improved production values of the *Journal*, make for a better informed membership. Members have been kept abreast of priority issues such as the GST, procedure codes, infectious diseases, and silver dental amalgams on an "as-news-breaks" basis.

The *Journal* continues moving toward greater emphasis on the "wet-gloved" dentist, and features more clinical articles as well as a regular section on patient communication. The *Journal's* wider scope helps practitioners prepare for the future. Recent articles identify patient trends, busyness numbers, and profile the oral care needs of tomorrow's dental patient.

CDA has also acted as dentistry's media spokesperson on national issues of interest and concern to both the profession and the public. Every week, calls from the media are fielded on subjects of concern to the Canadian public. And, at the internal end of the information spectrum, our toll-free phone lines are a concrete example of how important communicating with our members is to us. When your information needs are immediate, we're always on-line.

This past year, CDA successfully elicited support from the media and corporations in aid of its dental awareness program. A joint CDA/Colgate ad campaign to promote awareness of gum disease reached millions of Canadians through television and magazines. CDA's successful *First Teeth* program was relaunched with a national advertising program. A new *Patient Information System* is underway with a launch scheduled for 1991. This program will introduce a new series of patient education booklets and a revamped in-office distribution system. All of these programs promise increased success in educating Canadians and motivating them to good dental health and timely dental care.

Improvements to the CDA Convention have made it one of the premier dental meetings in Canada. This past August, over 4,000 people attended CDA's meeting. Participation in CDA's 1991 Convention in Quebec City is expected to top that figure. In addition, all CDA members will benefit from free pre-registration to the '91 Convention.

CFDE Fellowship for A University Dental Teacher

sponsored by:

Warner-Lambert Canada Inc.

PURPOSE: This award is offered annually to provide an opportunity for an established teacher in one of the Canadian schools of dentistry to refresh and extend his/her knowledge in any field of dental education or research. The intent of the award is to support non-degree programs of relatively short duration.

- CONDITIONS:**
1. The candidate must be a full-time member of the teaching staff of one of the Canadian schools of dentistry with a minimum of five years university teaching experience.
 2. The proposed program of study must be defined and well organized to ensure benefit to the individual and his/her dental school, and, minimally it must be of approximately one month's duration. Conventions and the like will not be considered as appropriate programs of study within the terms of this award.
 3. Applicants will apply by letter giving complete details of the proposed program of study. A curriculum vitae should be attached. Applications should be sent to the Canadian Fund for Dental Education no later than March 1.
 4. The candidate's application must be supported by a letter from his/her dean or other appropriate senior university official indicating approval of the study period and its benefits to the university and the individual staff member.
 5. Upon completion of the study period the Canadian Fund for Dental Education will expect to receive a report on the experience, a copy of which will be made available to Warner-Lambert Canada Limited.
 6. All applications will be reviewed by CFDE's Advisory Committee on Fellowship Selection. This committee will make its recommendation to the Fund's Board of Trustees, and the award winner's name will be announced shortly after the Board's annual meeting in May.

CFDE Fellowship for Dental Hygiene Teacher or Community Health Dental Hygienist

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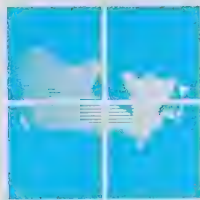
PURPOSE: This award is offered annually to provide an opportunity for an established teacher in one of the Canadian schools of dental hygiene to refresh and extend his or her knowledge in any field of hygiene education or research or to provide an opportunity for a dental hygienist with experience in community health to refresh and extend his or her knowledge in the field of community dental health. The intent of the award is to support non-degree programs of relatively short duration.

- CONDITIONS:**
1. The candidate must be a full-time member of the teaching staff of one of the Canadian schools of dental hygiene with a minimum of five years university or community college teaching experience or a dental hygienist engaged in community dental hygiene activities in an institutional or public health setting, with a minimum of five years experience in community health dental hygiene.
 2. The proposed program of study must be defined and well organized to ensure benefit to the individual and his or her dental school, and, minimally it must be of approximately one month's duration. Conventions and the like will not be considered as appropriate programs of study within the terms of this award.
 3. Applicants will apply by letter giving complete details of the proposed program of study. A curriculum vitae should be attached. Applications should be sent to the Canadian Fund for Dental Education no later than March 1.
 4. The candidate's application must be supported by a letter from his or her dean or other appropriate senior faculty official indicating approval of the study period and its benefits to the school of hygiene and the individual staff member. or a letter from the appropriate official of the dental hygienist's department, agency or institution indicating approval of the study period and its benefits to the agency and the individual dental hygienist.
 5. Upon completion of the study period, the Canadian Fund for Dental Education will expect to receive a report on the experience, a copy of which will be made available to Warner-Lambert Canada Inc.
 6. All applications will be reviewed by CFDE's Advisory Committee on Fellowship Selection. This Committee will make its recommendation to the Fund's Board of Trustees, and the award winner's name will be announced shortly after the Board's annual meeting in May.



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CDSPI Reports



This month, CDSPI Reports brings you a three-part article with news about ongoing programs and activities that are important to all members of Canada's dental profession.

1991 CDIP Features Lower Rates and Improved Coverage

CDSPI is pleased to announce further positive improvements and refinements to the Canadian Dentists' Insurance Program (CDIP). These changes are made possible by the close collaboration between CDSPI and its insurers, consultants and brokers, working together to provide what we believe to be the most comprehensive insurance program available to any professional group in Canada.

Some of the highlights of the CDIP for 1991 are as follows:

General Insurance

CDSPI has renewed its contract with the Guardian Insurance Company for another year. This extension translates into 14 years of continuity and stability which has enabled CDSPI to negotiate low rates and improvements for all participants in these plans.

Basic Life Insurance

For the fifth consecutive year, most Basic Life participants will receive a special premium discount. The 1991 discount will be 16.1% of the cost of coverage in force as of August 25, 1990.

Office Contents Insurance

To help dentists keep pace with the effects of inflation and the GST on office contents replacement costs, the CDIP is providing an automatic 10% increase for all office contents insurance coverage in increments of \$5,000.00.

In 1991, the rating tables for "Unprotected Buildings" will be eliminated for all provinces. All CDIP participants who now have coverage under this section will be automatically transferred to the same construction category (fire resistive, masonry, frame) as in the "Protected" tables. This change will bring about premium reductions for all dentists who are not fortunate enough to be located within 1,000 feet of a fire hydrant. No changes have been made to territorial alignments.

Practice Interruption and Comprehensive General Liability Insurance

For 1991, CDIP participants will enjoy premium reductions for both of these plans. These reductions again demonstrate the flexibility and stability of the CDIP — working for you.

Malpractice Insurance

The big news here is the addition of Excess Malpractice Liability insurance. This is a new plan available only to members of the CDA who are licensed to practice in Ontario and Quebec. It provides additional coverage over what dentists in these provinces now receive from their licensing fees.

Guaranteed Coverage

The Guardian Insurance Company has guaranteed malpractice coverage for the CDIP for 1992. This ensures coverage for the next two years.

Call CDSPI Toll-Free For More Information

The beginning of a new year is the perfect time for a dentist to make sure that he or she has adequate protection in all CDIP insurance plans.

The limitations of space do not allow more than a brief description of CDIP improvements for 1991. If you have any questions, or if you require assistance with your insurance review, you are invited to call CDSPI and speak to a Personal Service Representative who will be able to answer your questions. Also, the 1991 CDIP Program Information Portfolio will be able to supply further information.

Remember, the CDIP is available only to dentists from your partners in personal and practice protection . . . the CDA and CDSPI.

Note: In the Province of Quebec, beginning January 1, 1991, dentists must be members of the Canadian Dental Association in order to apply for and/or increase their coverage in these plans and programs.

CDSPI Schedules Fourteen Retirement Planning Seminars for 1991

Beginning in February, CDSPI will be presenting its new series of Retirement Planning Seminars across Canada. CDSPI developed these important seminars to respond to the unique decisions dentists

and their spouses must make well before retirement becomes a reality.

The content of these seminars is continually expanded and updated to include the most recent Federal and Provincial government legislation and trends. They provide dentists of all ages with solid information regarding future financial security, housing arrangements, use of leisure time, health care, estate planning, valuing a dental practice and more. By attending these seminars, you obtain valuable advice on how to sell a practice, calculate net worth and plan for adequate retirement income.

For the first time, the seminars will extend over two full days. This extension comes as a result of many requests from dentists wanting to spend more time on certain topics.

Remember, it's never too early to plan for retirement — and this seminar is a practical, enjoyable way for dentists and spouses to learn how to achieve their retirement goals.

To obtain a copy of the Retirement Planning Seminar agenda and dates for the seminars, please call or write to Pat MacNab, Seminar Co-ordinator at CDSPI.

In addition to our series of Retirement Planning Seminars, CDSPI has scheduled nine Advanced Retirement Planning Seminars for 1991 — exclusively for "graduates" of our regular seminars. The Advanced Planning Seminars give previous attendees the opportunity to get up-to-date, to maximize current financial opportunities and, most importantly, to avoid those well-disguised traps. You can bring your retirement planning questions and have them answered in a workshop format. Again, complete details on these stimulating, informative sessions are available from CDSPI.

The CDA RSP: The Retirement Advantage Available Only To Canada's Dental Profession

When Canadian dentists, just like you, explore all the RSP opportunities available to them, they appreciate more than ever the benefits offered by the CDA RSP.

As a member of the CDA, or a co-sponsoring provincial association, you, your spouse, your children and your employees are entitled to enjoy these special financial benefits and privileges. The CDA RSP offers proven performance, choice, flexibility, growth and security. Because CDSPI is working for you, there are no front end fees, no commissions, no

opening and closing fees, and no fees to transfer from one fund to another. You only pay a low administration fee of less than 1% per year.

For over 30 years, the CDA RSP has been making your money work harder, building your retirement income while increasing your personal wealth.

A glance at the calendar tells you that the time to increase your money-making power for 1991 is near. Don't delay this decision — act today while it is on your mind and beat the rush around the March 1, 1991 deadline. The CDSPI RSP staff are always on hand to assist you and offer personal service. Call CDSPI today and get the CDA RSP making more money for you.

CDSPI

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Glove punctures

Six dentists who routinely used gloves were supplied with 20 of each of 5 types of non-sterile gloves and asked to return those considered to be intact after clinical use for examination for undiagnosed punctures by a water inflation method. The glove types were designed for single and for multiple use. In the second part of the study 2 types of latex gloves from the operative and passive hands of the operators were compared. The total time for which gloves were used was recorded as well as details of clinical treatment.

The results showed 85% of the gloves were considered to be intact after use by the clinicians. The incidence of undiagnosed punctures varied considerably with glove type (3-49%) and among the practitioners (9-29%). Some gloves, notably the vinyl type investigated (Featherweight; Becton Dickinson) appeared to be more prone to puncture. More than 60% of the undiagnosed punctures were in the thumbs and second fingers of the gloves.

Did you know?

It's About the Government

*Somewhat irreverent —
by Robert Welch in
"American Opinion"*

The government is my shepherd, I need not work. It alloweth me to lie down on good jobs; it leadeth me beside the still factories. It destroyeth my initiative; it leadeth me in the paths of the parasite for politics' sake. Yea, though I walk through the valley of laziness and deficit spending, I shall fear no evil; for welfare and its vote-getters, they comfort me. I prepareth an economic utopia for me by appropriating the earnings of my grandchildren. It filleth my head with rubbish; my inefficiency runneth over. Surely the government shall care for me all the days of my life and I shall dwell in a fool's paradise forever.

Gloves intended for multiple patient use were found to have the lowest incidence of undiagnosed punctures. However the single-patient-use gloves were typically mis-used, in that they were worn during the treatment of more than one patient. Further studies are needed to determine when and why undiagnosed punctures occur.

The data showed that the probability of puncture, and hence the potential for cross-infection, increased with glove-wearing for more than one patient or for lengthy periods of time with a single patient. Δ

Burke, F.J.Y., Wilson, N.H.C. *Brit Dent J* 168:67-71, 1990.

Special thanks to **THE DENTALETTER**,
June, 1989.

Providing about 25 concise summaries in each eight page issue **THE DENTALETTER** keeps dentists' clinical knowledge up to the minute with only a 1/2 hour of reading per month. For subscription information contact 133 Richmond St. W., Toronto M5H 3M8, telephone (416) 869-1777.

Marketing the Dental Practice

La promotion du cabinet dentaire

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One copy of the above package of articles is available for \$5.00 to all CDA members and for \$10.00 to non-members. (Ontario residents, please include 8% sales tax.)

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Les membres de l'ADC peuvent obtenir pour 5\$ et les non membres pour 10\$ une copie des articles de la bibliographie ci-dessus.

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Programme informatique

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Library Acquisitions

- Kaban, Leonard B. *Complications, poor results, and treatment failures* (Oral and Maxillofacial surgery Clinics of North America vol. 2:3). Philadelphia: Saunders, 1990.
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Use your time wisely

- Are you in a study club?
- Do you speak to community groups?
- Would you like a simple way to keep up with dental literature?

Let the CDA library provide your research.

We offer:

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Don't leave it to luck. Leave it to CDIP

Crossing your fingers and trusting to luck is a poor substitute for the solid protection you get with CDIP Office Contents and Practice Interruption Insurance. If your office suffers fire, theft or water damage, your CDIP coverage will replace or repair lost or damaged furnishings and equipment and help ensure the successful continuance of your dental practice.

Why take the risk of being underinsured? Our records indicate that the amount of Office Contents and Practice Interruption insurance held by Canadian dentists, just like you, is all too often below today's costs of replacing equipment and furnishings... estimated at \$150,000 for only two operatories. The facts of life are these: in 1989, a total of 381 claims were received by CDSPI relating to office contents. Most of these claims were for damage to dental offices as a result of fire, theft or water damage.

Your Practice Interruption coverage should equal at least four times your maximum monthly billings. This amount should include any anticipated growth in billings over the next 18 months.

Office Contents and Practice Interruption insurance are two of the most important plans offered through CDIP — a program sponsored by the Canadian Dental Association and the co-sponsoring provincial associations... coverage tailored to the needs of the dental profession.

Take time now to review your coverage. We would be pleased to send you a copy of our free "Office Contents and Valuation" folder to assist you. If you need further assistance, call CDSPI toll-free and ask to speak to a Personal Service Representative. A few dollars spent on adequate coverage *now* could pay big dividends in the future.

Available only to the dentists of Canada from your partners in personal and practice protection...



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The DAP Advisor offers information, ideas and advice to improve dentist/patient communication, raise awareness about good dental health, and help your practice become busier.

The Three "Bs" of Collection

- **Be prompt.** The wheels of collection should be set in motion the day an account comes due.
- **Be consistent.** Each and every time a payment is past due the patient should receive a phone call. These prompt and consistent reminders will let patients know that you are going to monitor the collection of past due accounts. Persistent reminders will make patients less likely to wait until the monthly statement arrives to make payment.
- **Be considerate.** People are more likely to respond positively to you if you respect their needs. If a patient has requested being contacted at home or at work during specific hours, respect the request and confine your phone calls to the times and locations indicated.

Communication: The Key to Collecting Overdue Accounts

In the best of all possible worlds, patients would pay for their treatment immediately after having received it. That is the time, after all, when the experience is still fresh in their minds, and they are most likely to feel an obligation to pay for services that have been so recently rendered. In the real world, however, it is not always possible for patients to pay at the end of a dental visit. For that reason, someone in your practice — be it your bookkeeper, business manager, receptionist or someone else — has to act as your financial secretary, keep track of who owes you what, and ensure that payments are collected quickly and efficiently.

Bill collection is an activity whose success hinges in large part on how it is perceived within your practice. If, for example, collection is seen as an unpleasant and essentially fruitless chore, then the person doing it may be more inclined to give up before payment has been received, or resort to a variety of ineffectual procedures — like churning out statements month after month to no avail. Another measure that is generally ineffective is sticking notes on monthly statements urging patients to pay their overdue accounts. The collector may resort to this measure in an effort to avoid having to talk to the patient over the phone — a task which may be perceived to be unpleasant and potentially embarrassing.

If, on the other hand, the collection process is perceived positively, as an opportunity to foster good paying habits in patients, and a chance to eliminate the need to pursue them for overdue accounts in future, then collection is more likely to be a successful endeavour for both your patients and your practice.

The best way to ensure that bills are paid is to set up a collection process that makes it as easy as possible for patients to pay. Such a process benefits both your patients and your practice. It benefits your practice by facilitating prompt payment and enabling the person in charge of bill collection to direct his or her attention to other important tasks. It benefits the patient by being flexible enough to accommodate the patient's particular needs: when patients know their needs will be attended to, and they may be able to work out their own payment schedule, they may seek out your dental services more frequently. And it benefits you both by opening the lines of communication and giving you a better idea of what to expect from each other.

It's Simple:

1. After treatment, ask the patient how payment is to be made. Set out mutually acceptable terms of payment at this time.
2. Either at the time of the visit, or a few days later, send the patient a bill detailing the charges and the due date of the first, and if any, subsequent payments. Record this information in your practice's active collection file. Whether your collection procedure is manual or computerized, all pertinent financial information must be recorded, and stored in such a way as to make the timely information accessible on a daily basis.
3. Each and every morning, review the active collection files and make a list of accounts that fell due that day. With all of the patient particulars in front of you — the patient's name, telephone number, amount owing and due date — contact the patient by telephone. Remember, the telephone is your first and best recourse because it allows direct communication. Over the telephone you can remind patients of their obligation to pay, and, if necessary, strike a new payment arrangement.
4. Once on the phone, they may say, for instance, that three monthly instalments would be preferable to two. If that is acceptable, you and the patient can agree upon the dates and terms of these payments. Note this information in the patient's collection record and insert the updated record into the active collection file. On the date that payment falls due, pull the information. If payment hasn't arrived, contact the patient again by telephone.
5. Towards the end of the month, if payment has still not arrived, send a statement detailing the charges and the agreed-upon payment schedule.
6. When a payment arrives, mark it on the payment record. Then, insert the record in the active collection file behind the next due date. Continue the process until the bill has been paid. At that time, mark the patient's payment record "paid in full" and remove it from the active collection file.



The DAP Advisor is a service of CDA's Dental Awareness Program, an ongoing campaign dedicated to helping all Canadians keep their teeth Good For Life.

TYLMAN'S THEORY AND PRACTICE OF FIXED PROSTHODONTICS, 8TH EDITION

W.F.P. Malone and C.A. Koth

1989, Ishiyaku EuroAmerica, St. Louis and Tokyo
461 pages, black and white with some color illustrations

One of the standards in crown and bridge has undergone an overdue extensive revision. To the delight of the reviewer, it is a true revision that transforms an archival seventh edition into a modern eighth edition. There are almost 300 fewer, albeit larger, pages. The latest edition is easier to read and better illustrated with black and white and some color illustrations. The book remains a compendium of fixed prosthodontics while putting less emphasis on technical laboratory procedures.

New chapters include Caries Management, Esthetic Bonding (Laminates), Resin-Bonded Retainers (Maryland Bridge), Interocclusal Records, Fixed-Removable Prosthodontics, Glass Ionomer Cements, Stomatognathic Dysfunction, Cerestore, and the Dicor Castable Ceramic System. The emphasis on current conservative techniques is welcome. A discussion of liners and bases has been added to the chapter on Cements in Restorative Dentistry. A chapter on Occlusion effectively replaces three chapters from the seventh edition as does a chapter on Articulators. There is more of a general principles approach to techniques, procedures and equipment in the eighth edition. One obvious exception to this trend is chapter 13 where only the Pindex system is outlined for the fabrication of removable dies.

Chapters eliminated in this latest revision include Overdentures, Precision Attachments, Aluminum Reinforced Ceramics, Gnathologic Procedures, Color, and Machine Milled Copings for Periodontal Prosthodontic Rehabilitation. Overdentures are discussed in a chapter entitled Periodontal Considerations for Fixed Partial Dentures. Precision attachments were wisely omitted as one chapter could not hope to cover even the variety of attachments available. Gnathology and the pantograph are not essential in a book on basic prosthodontics. Color is another broad topic which can best be dealt with in a separate text. The text loses nothing of urgent significance with these deletions.

Chapter 9 is entitled "Tissue Dilation for Cast Restorations" in the Table of Contents and "Tissue Management for Fixed Prosthodontics" in the text. Tissue dilation is the more correct title as retraction is the main topic. There are other typographical errors but none that detract from the overall usefulness of the book.

Flow charts are effectively used throughout this edition as a concise mechanism to define alternatives in treatment or management. Every chapter is extensively illustrated and even more extensively referenced. The reader is often referred to the bibliographies for further information rather than attempting to exhaustively include unnecessary detail.

Malone & Koth et al succeed in elaborating the current basics of crown and bridge. It is not surprising that there are some conflicting concepts in a book with 49 contributing authors. The reader is left to review the material and to develop conclusions based on a variety of opinions. While some dated concepts are still included (narrowing occlusal tables, loop connectors), the totally revised eighth edition is nonetheless an essential in a modern library of fixed prosthodontics.

This book was reviewed by:
Dr. Ken Sutherland
Head, Restorative and Prosthetic Dentistry
University of Saskatchewan

DIFFERENTIAL DIAGNOSIS OF DISEASES OF THE ORAL MUCOSA

W. Bengel and G. Veltman

(translated by H. Taschini-Loevy and P. Taschini)
1989, Quintessence Publishing Co., Inc., Chicago
361 pages, colour photographs

This text is presented in an atlas format and is structured, as initially conceived by Veltman, as paired clinical photographs of oral and perioral lesions, similar in clinical presentation but aetiologically unrelated. There is a significant dermatology input to this book; firstly Veltman was a dermatologist and secondly his approach to the differential diagnosis of oral mucosal diseases is unique and in keeping with the medical background of individuals studying dentistry in Germany.

Chapter one is devoted to a short discussion of basic principles and follows an interesting and brief introduction and historical perspective. The main body of

the text is divided into 6 chapters organized according to the author's original and unique clinical classification of oral diseases and conditions, specifically, Tongue Changes, Cheilitis, and then four chapters each concerned with the main symptoms of Light Spot, Dark Spot, Tissue Defect and Increase in Volume. The whole of this unusual classification is illustrated on a full two page flow diagram which presents almost the entire subject matter referenced by condition and page number.

Numerous summary charts, algorithms explaining differential diagnostic techniques and a number of line body diagrams outlining the dermatologic distribution of various lesions accompany the paired clinical photographs. As with all Quintessence publications, especially in this format, the paper quality is superb as are the colour prints. Figures are well documented, clearly labeled and numbered by chapter for ease of cross referencing. A clear type face with bold subtitles and sub-sections, together with the excellent photographs and illustrations results in a very functional and attractive text.

Because of the atlas format the writing style is somewhat "choppy" and stilted, while some of the terminology is unusual or confusing. A fibroepithelial of buccal mucosa is called "proptosis buccalis". Yet another classification and definition of leukoplakia is introduced and the authors further confuse the issue with the following statement regarding the classification of white lesions: "For clinical use, it is possible to divide white mucosal lesions according to the level of pathologic change in the oral mucosa". The reference section is cumulative at the end of the text and of the 189 citations, only 25 are English language publications — understandable given the origins of this work, but limiting the book's effectiveness as an in-depth reference text in North America.

Despite these minor shortcomings, the text remains true to its originally stated concept and audience, and is, "a versatile and quick-reference text for dentists, for dermatologists and for students in these fields". *Differential Diagnosis of Diseases of the Oral Mucosa* should prove to be a unique and useful addition to one's professional library.

This book was reviewed by:
Robert W. Priddy, DDS, MSc, FRCD(C)
Chairman, Division of Oral Pathology
Faculty of Dentistry
University of British Columbia



Statistiques . . .

OBJET : « Quebec Dental Manpower and Demand for Dental Care from 1985 to 1988 » par le D^r Brodeur, numéro d'août 1990 du Journal de l'Association dentaire canadienne

J'ai été très surpris de lire, dans la livraison de ce mois du *Journal* de l'Association dentaire canadienne, un article sous votre signature et celles des docteurs Simard et Lussier dans lequel vous affirmez que « . . . que 47 % des Québécois ont eu recours annuellement aux soins dentaires en 1988. . . » vous amenant ainsi à conclure que « . . . la demande pour les services dentaires semble avoir atteint un plateau. . . » au Québec, ayant même diminué de 7,9 % de 1985 à 1988, et à suggérer que les campagnes d'information publique menées par l'Ordre des dentistes au cours de cette période n'auraient pas eu d'influence sur le taux de fréquentation du dentiste et sur la motivation de la population à solliciter des soins dentaires.

En vous référant aux résultats de deux études d'opinion réalisées en novembre 1985 et en décembre 1988, j'ai été déçu de voir que vous n'avez pas nuancé les résultats de décembre 1988, compte tenu de la mise au point que je vous avais adressée à ce sujet en janvier 1989. Comme je vous l'indiquais à l'époque, le résultat de 46 % du sondage SOM de décembre 1988, quoique réel, ne peut se comparer aux résultats de 1985 parce qu'il ne répond pas à la question de la même façon. À cette fin, comparons les résultats des enquêtes de novembre 1985, d'août 1988, de décembre 1988 et de décembre 1989.

Question : « Quand êtes-vous allé chez le dentiste pour la dernière fois »?

Réponse :

	-de 6 mois	6 mois à 1 an	-de 12 mois	12 mois et -	1 an à 2 ans
IQOP NOV. '85 (n=870)				51 %	17 %
SOM AOÛT '88 (n=1061)	36 %	20 %			9 %
SOM DEC. '88 (n=1059)			46 %		21 %
SOM DEC. '89 (n=1000)				56 %	12 %

Comme on peut le constater, la méthode de classification des réponses obtenues selon l'interprétation qu'en font les répondants peut faire varier les résultats. Or, si on compare plutôt les résultats de 1985 avec ceux d'août 1988, on constate que le taux de visites annuelles chez le dentiste a augmenté de 9,8 % passant de 51 % à 56 %, ce qui fut également confirmé dans l'étude de décembre 1989.

La comparaison des résultats de ces quatre études permet aussi de dégager

que le taux de fréquentation du dentiste au cours des 24 mois précédant l'enquête a été, de 1985 à 1989, plutôt stable, s'établissant respectivement à 68, 65, 67 et 68 %.

Enfin, il est intéressant de constater qu'au cours d'une enquête effectuée en décembre 1989 à la demande de Radio-Québec, c'est-à-dire à la même période que celle réalisée par l'ODQ, on trouve un taux de fréquentation annuelle de 58 %, tel qu'en font foi les résultats suivants :

Question : « En moyenne, à quelle fréquence allez-vous chez le dentiste au cours d'une année? »

Réponse :

	-1 fois/année	1 fois/année	2 fois/année	+2 fois/année
SOM DEC. '89 (n=1000)	37 %	26 %	25 %	7 %

Je doute, comme vous l'affirmez, que la demande annuelle de soins dentaires ait atteint un plateau au Québec. Cependant, si cela devait être, ce plateau se situerait plutôt autour de 60 % que de 50 % comme votre article le laisse croire.

J'espère que vous recevrez positivement cette mise au point que je juge importante

et vous prie de croire, cher docteur Brodeur, en l'assurance de mes sentiments distingués.

Jacques Richer, BSC, DSA

*Le directeur des services administratifs
et des communications,
Ordre des Dentistes du Québec*

La Réponse du D^r Brodeur :

Nous vous remercions pour toute l'attention que vous avez portée à notre article et pour la critique que vous en avez faite. Les quelques commentaires que nous recevons suite à nos publications nous viennent habituellement de scientifiques de notre discipline et il n'arrive malheureusement pas assez souvent que des lecteurs nous transmettent librement leurs opinions comme vous l'avez fait. Cette lettre nous venant du directeur des services administratifs et des communications de l'Ordre des dentistes du Québec, organisme qui a été très actif dans l'organisation de campagnes d'éducation populaire, est à ce point de vue stimulante.

Le premier paragraphe de votre lettre du 16 août 1990 laisse entendre qu'étant donné que « la demande pour les services dentaires semble avoir atteint un plateau », l'article en rubrique « suggère(r) que les campagnes d'information publique menées par l'Ordre des dentistes au cours de cette période n'auraient pas eu d'influence sur le taux de fréquentation du dentiste et sur la motivation de la population à solliciter des soins dentaires ». Or, l'article ne fait aucunement cette relation. Soit, il y est avancé dans la discussion que les campagnes d'éducation de l'Ordre ne semblent pas (à noter le bémol) avoir affecté le taux d'utilisation des services. Cependant, il n'est pas recommandé dans les conclusions d'abandonner cette promotion. Au contraire, on y propose de mettre sur pied des programmes d'assurance dentaire en vue de l'accroissement de l'utilisation des services et de l'amélioration de la santé dentaire, *en plus des campagnes d'éducation populaire*.

Vous faites le reproche aux auteurs de l'article, dans le deuxième paragraphe de votre lettre, de n'avoir pas tenu compte de votre mémo du 13 janvier 1989. Vous suggériez alors de « comparer les résultats de novembre 1985 à ceux du mois d'août 1989 ». Pour des motifs de méthodologie — évidents à des professionnels du domaine — il était impossible de donner suite à une telle proposition. On doit en effet comparer les réponses à des questionnaires administrés aux mêmes dates afin de couvrir les mêmes périodes de temps et de s'adresser à des populations similaires. Les résultats provenant de sondages d'opinions présentent toujours plusieurs biais, bien connus tant des scientifiques que du commun des mortels, et il n'est pas habituel de les énumérer lors de la rédaction d'un article. Le biais

que vous mentionnez, soit l'interprétation des questions par les interviewers, est habituellement présent. Dans ce cas-ci, la « misclassification » du douzième mois dans la période 1 à 2 ans, si elle a été pratiquée par tous les interviewers, ne représente qu'une différence de 1,75 % ($21\% \div 12$) et n'affecte pas les résultats de façon significative. C'est pourquoi, nous n'en avons pas tenu compte d'autant plus que le biais de la réponse attendue, qui agit dans le sens inverse, a amplement compensé cette sous-estimation.

Enfin, après avoir trouvé, à la lumière de quatre études, « que le taux de fréquentation du dentiste au cours des 24 mois précédant l'enquête a été de 1985 à 1989 plutôt stable », vous concluez à la fin de votre lettre : « je doute

... que la demande annuelle de soins dentaires ait atteint un plateau ». C'est votre plein droit. Quant à nous, en tant que scientifique, nos conclusions doivent se baser sur des données comparables et interprétées de façon scientifique; c'est ce que les auteurs de l'article en titre ont tenté de faire.

Nous espérons que ces quelques considérations vous apporteront l'éclaircissement souhaité sur notre approche et ne refroidiront pas votre enthousiasme dans l'organisation de futures campagnes d'éducation populaire.

Veuillez agréer, cher Monsieur Richer, l'expression de nos sentiments les meilleurs.

Jean-Marc Brodeur, DDS, PhD



Statistics Cause Static

Re: "Quebec Dental Manpower and Demand for Dental Care from 1985 to 1988" by Drs. Brodeur, Lussier, and Simard in the *Journal*, August 1990.

I was very surprised to read, in this month's issue of the *CDA Journal*, an article written by yourself (Dr. Brodeur), Dr. Lussier and Dr. Simard in which you state that: "The percentage of the (Quebec) population using dental services annually was 47% in 1988. . . ." leading you thus to conclude ". . . the demand for dental care (in Quebec) appears to have reached a plateau. . ." having in fact dropped by 7.9% between 1985 and 1988. You also suggest that the public

information campaigns conducted by l'Ordre des Dentistes du Québec (ODQ) during that time had no influence on the percentage of people visiting the dentist nor on their motivation to seek dental services.

I was disappointed to note that when you mentioned the results of the two opinion polls of November 1985 and December 1988, you did not qualify the December 1988 results in view of the clarification I sent you on this subject in January 1989. As I pointed out at the time, the 46% result of the December 1988 SOM poll, though accurate, cannot be compared to the 1985 results since the question is not answered in quite the same way. To this end, let us compare the poll results of November 1985, August 1988, December 1988 and December 1989.

Question: When did you last visit the dentist?

Response:

	6 months	6 months to 1 year	12 months	12 months +	1 to 2 years
IQOP NOV. '85 (n=870)				51%	17%
SOM AUGUST '88 (n=1061)	36%	20%			9%
SOM DEC. '88 (n=1059)			46%		21%
SOM DEC. '89 (n=1000)				56%	12%

As we can see, classification of the answers may vary the results because of the manner in which respondents interpret the question. If we compare, then, the results of 1985 to those of August 1988, we notice that the rates for annual visits have gone up from 51% to 56% making for an increase of 9.8%; this is confirmed as well by the December 1989 poll results.

Comparing the results of these four polls allows us to state that the percentage of people visiting the dentist in the 24 months preceding each poll has been rather stable between 1985 and 1989, each recorded as 68, 65, 67, and 68%, respectively.

Finally, it is interesting that in a poll conducted in 1989 at the request of Radio-Quebec — that is, at the same time as the ODQ poll was carried out — the

percentage of people visiting the dentist annually was 58%, a figure borne out by the following figures:

Question: On average, how often do you visit the dentist in the course of one year?

Response:

	less than once a year	once a year	twice a year	more than twice a year
SOM DEC. '89 (n=1000)	37%	26%	25%	7%

I doubt that the annual demand for dental services has reached a plateau in Quebec, as you affirm. If it were the case,

however, this plateau is more likely to be around 60% than the 50% that your article posits.

Dr. Brodeur Responds:

Thank you for the attention that you have given to our article. The few comments that we receive on our publications usually come from scientists in our field and it is not often enough unfortunately that readers give us their opinions freely like you did. Coming from the Director of the Administrative Services and Communication of *l'Ordre des Dentistes du Québec*, an organization that has been very active in organizing public education campaigns, this letter is exciting.

The first paragraph of your letter of August 16, 1990 implies that, given the fact that "the demand for dental care appears to have reached a plateau," the article published "suggests that the public information campaigns conducted by the ODQ during that time had probably no impact on the percentage of people visiting the dentist and on their motivation to seek dental care." The article does not in any way establish such a relationship. I will grant you that it is put forward in the discussion that the ODQ campaigns do not *seem* to have had an impact on the percentage of people using the services. However, it is not recommended in the conclusions that this type of promotion should be given up. On the contrary, we suggest that dental insurance programs should be established with a view to increasing the use of dental services and improving dental health, *aside from the public education campaigns*.

In the second paragraph of your letter,

you blame the authors of the article for not having taken into account your memo of January 13, 1989. You then suggested to "compare the results of November 1985 to those of August 1989." For methodological reasons — obvious to professionals in the field — it was not possible to follow such a suggestion because we have to compare the answers of questionnaires given at same dates in order to cover the same time periods and to address similar populations. The results from opinion polls always present many angles, a fact well known by both scientists and others, and it is not customary to list them when writing an article. The angle you mention, i.e., the interpretation of the questions by the interviewers, is usually there. In this case, the "misclassification" of the twelfth month in the 1- to-2-year period, if made by all the interviewers, represents only a difference of 1.75% (21% – 12) and does not significantly affect the results. That is why we have not taken it into account, not to mention the fact that the expected answer angle, which goes in the opposite direction, does more than enough to compensate for this underestimation.

Finally, after having found, in the light of four studies, "that the percentage of visits to the dentist in the 24-month period preceding the survey was rather stable from 1985 to 1989," you conclude at the end of your letter: "I doubt. . . that the annual demand for dental care has reached a plateau." You

have the right to do so. But for us, as scientists, our conclusions must be based on comparable data and interpreted scientifically. That is what the authors of the article have tried to do.

We hope that these few observations will give you the clarifications you wanted and will not quell your enthusiasm when organizing public education campaigns in the future.

Jean-Marc Brodeur, DDS, PhD



Gratitude

I was profoundly moved by your editorial "Gratitude" which was printed in the August issue of the *Canadian Dental Association Journal*.

Thank you for reminding me to be grateful to be a member of a health profession built on the tradition of caring and knowledge sharing.

Edward H. Mazak, DDS
Dental Consultant
Green Shield Prepaid Services Inc.



Congratulations

I, along with dentists throughout Canada, recently received the August, 1990 issue of the *Canadian Dental Association Journal* along with the supplemental Symposium Report.

The quality of this particular issue prompted me to put pen to paper to offer you and the staff congratulations on an excellent publication. Over the past few months there has been a steady growth in scientific articles, use of photographs and inclusion of informative articles or "news" on issues and individuals.

The profession should feel proud of the *Journal* as a prime method of the association keeping the dentists of Canada informed in clinical studies, scientific research and current issues under discussion. While more detailed information can be found in scientific or specialist publications, Canadian dentists are well served by their own *Journal*.

Roger L. Ellis, DDS, MSc
Registrar
Royal College of Dental Surgeons of Ontario

You and your confreres have finally developed the *CDA Journal* into a journal of importance and relevance. I don't say this lightly. After spending seven years in CDA councils nagging and complaining about the *Journal*, you finally made the difference.

The visual quality and presentation is superior. The material is local, provincial and national. It is dental and general. It is interesting and professional.

Now if you can get the July *Journal* to me in July, you'll have it made!

Dr. Earl Frieden
Saskatoon, Sask.

Implants: not enough evidence

Dr. Zosky's opinion piece in the August *CDA Journal* was not helpful. The important issue before us is whether there is good clinical evidence that justifies the use of implants in dentistry. Well, yes there is in the case of the Nobelpharma implant system. For the others, no, there is not yet enough evidence to justify using any of them. Continuing research will no doubt bring improvements, perhaps even revolutionary changes. When new ideas are tested methodically, some will be found to deserve to be incorporated into clinical practice. It will always be better if at every stage we trust science over advertising.

There must be many practitioners who are depending on Health and Welfare

Canada's "Notice of Compliance" — published in this *Journal* — an assurance that several other brands of implants are "safe and effective". This assurance is valueless. H&W had seen no clinical trials to back its evaluation, although we had been led to believe the Department demands them. Among the criteria that H&W *claims* to ask for is, "... a success rate of 85% [or better] at the end of two years of loaded service." No such evidence was available to H&W from studies published in the dental literature when Notice of Compliance was issued for CoreVent and IMZ. It is inconceivable that, if evidence had been available, any manufacturer would have kept such sales-effective data from the profession. One can reasonably conclude that H&W chose to ignore its own guidelines.

Just what bases H&W may have had for admitting CoreVent and IMZ to the general dental marketplace is, and must remain, a mystery. "The clinical study reports on dental implants sold in Canada are not in the public domain, thus [we are] not able to provide copies of these reports. . .", is the response one gets from H&W. Nor is it helpful to demand the data through the Access to Information Act. To release any material that manufacturers may have provided to the government relating to safety and effectiveness, H&W needs the consent of the manufacturers. H&W says that CoreVent and IMZ have not agreed to the release of information.

It is a matter of some interest that, in contrast to the Ottawa approach, the Food and Drug Administration in the US has promulgated stringent criteria for premarket approval of implants. Even those manufacturers whose products are already on the U.S. market will be required to show evidence next year that they can meet the toughened regulations. The hurdles that they will have to get over are no more and no higher than is sensible, given the potential for damage and morbidity that an ill-advised method could have.

It will be pathetic if, in a year or two, Health and Welfare Canada is found to have permitted implant systems that the Americans have insisted be withdrawn.

The matter is too important to rest here. But it should not be continued as a slinging match between Zosky and me. A sober, objective, qualified assessment is required, perhaps paid for by the CDA. Not the silliness of a "consensus confer-

ence"; we need an examination of the evidence by people who understand clinical research.

Hugh Mackay, DDS, MSc
Toronto, Ontario



Bar None

Had I not worked in a medium security prison for the past ten years as a dental assistant, I would never have had the courage to attempt such a work placement after reading the article by Corinne A. Lee, *CDA Journal*, July 1990, "No Holds Barred. Dental Assisting in Prison."

I believe that some of the points she made are valid; but I found the article to be overly negative and sensationalized. In my experience, I have found the prison environment an acceptable place to work. If you treat the inmates reasonably, for the most part they respond in kind, as is the case in private practice. I have not found it necessary to become "strongly assertive" at any time in dealing with these patients. A strongly assertive approach is going to elicit a negative response in any practice.

Where I work, inmates request to be seen by the dentist and therefore are there because they want dental care. In very few cases do they attempt to manipulate the dentist or assistant.

I feel that if one acts professionally and keeps common sense precautions in mind, such as Ms. Lee mentioned in her check list of safety habits, then the penitentiary can be a rewarding place to work.

Carol Hamilton, RN
Warkworth, Ontario

Addiction Research Foundation

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Gingival health. Nothing is more important in determining the long-term patient acceptance of dental restorations. Today, our skill in accurately recreating natural tooth form with crowns and fixed partial dentures is constantly being enhanced with new materials, techniques and technology. We are able to restore masticatory, phonetic and esthetic function more easily and reliably every day through prostheses possessing strength values unheard of only a decade ago. Yet, for all our combined abilities, we somehow find it difficult to create cases that address the patients' current gingival status and/or ensure the maintenance of their gingival health.

The reason is quite simple. Accepted standard impression, modelling and prosthetic techniques have, for all intents and purposes, failed to provide and/or take into account, a clear picture of the current gingival conditions in the patient's mouth. With Soft Gingival Models, all of this has changed. Now, the technician can accurately reproduce and study the actual state of the patient's soft tissues before designing the case.

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With a Soft Gingiva Model, the technician can quickly identify and plan for



H.J. Maier, RDT

gingival situations that could otherwise dramatically influence the esthetics and function of the completed case. In anterior cases, reproduction of exposed roots due to gingival recession allows case designs that guarantee a harmonious crown contour without changing the positions of the labial cervical and cingulum points. The height and contour of the interdental papilla are clearly indicated, ensuring contact points that avoid pressure on the gingiva. If gingival atrophy has occurred (where the interdental papilla has become flat), a restoration can be constructed allowing easy oral hygiene, improved phonetics and an esthetically pleasing appearance.

In cases involving molars, the precise direction of the root can be easily determined and used to help position the cusps properly. Contact areas can be accurately contoured to avoid exerting pressure on the gingiva while, at the same time, providing adequate space for proper oral hygiene. Even atrophied interdental papilla can be easily seen in the molar area ensuring adequate embrasure width is created for self-cleaning.

All of these situations would be difficult, if not impossible, to detect under standard techniques. Even if noted by the practitioner, the actual condition would be difficult for the technician to visualize accurately. With Soft Gingiva Models, the technician can see each situation almost as if he were examining the patient himself. The result: accurate prostheses that

address gingival problems correctly the first time and maintain gingival health in the long term.

SOFT GINGIVAL MODELS — Ask your laboratory about this exciting new technique today. Δ

Mr. H.J. (Hyo) Maier, RDT is President of Aurum Ceramic/Classic Dental Laboratories Ltd.

CFDE now accepting fellowship applications for teacher/researcher training

The Canadian Fund for Dental Education has announced that March 1, 1991 will be the deadline for filing applications for a CFDE teacher/researcher fellowship for the 1991/92 academic year.

Forms and information may be obtained from the Dean's office in each of the Canadian Faculties of Dentistry or through the office of the CFDE, located at 1815 Alta Vista Drive, Ottawa, Ontario, K1G 3Y6, (613) 731-0493.

Candidates must be Canadian citizens or permanent residents who have completed an undergraduate course in dentistry, dental hygiene or a program in science and be eligible for admission to a graduate school.

Applicants must declare their firm intention to become a teacher and/or researcher in a Canadian Faculty of Dentistry or Dental Auxiliary Training Program. The minimum commitment in this regard is two days per week and preference will be given to those applicants who will return to a full-time teaching/research position.

The number and the value of each fellowship will be determined by the Fund's Advisory Committee on Fellowship Selection and the Board of Trustees.

The names of the fellowship recipients will be announced after the CFDE annual Board of Trustees meeting, in mid-May 1991. Δ

"CDAnet comes down to one thing: information out, information back — fast.

That one fact is going to improve dramatically the claims process in my practice."

*Dr. Robert Simonsky
Toronto, Ont.*

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Fast means sending out a claim electronically to the carrier and receiving confirmation that it's been received or on-line adjudication in 20-30 seconds. value of their treatment and how much they'll be reimbursed — on the spot. And the claim is entered into the carrier's payment cycle — on the spot.

"What's crucial for me is the control of CDAnet by dentistry; it guarantees my privacy and my security."

*Dr. Douglas Pauls
Vancouver, B.C.*

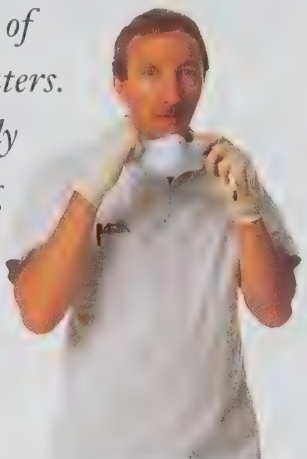
On-line adjudication spells out what's covered and how much will be paid for treatment performed. Patients know the That means payment will be made **fast**. **Simple** means the same procedure for every claim for every carrier — one process,

one button. It means a system that's so easy anyone can use it with minimal training. It means no more claim form, no more postage, and no more paper chase. It's that simple.

Smart is having every major national carrier in the country hooked up to CDAnet. Smart is a system that automatically checks that every claim is complete before it's sent, and then automatically sends it to the correct carrier. And smart is a network that's owned and controlled by dentistry, which means your privacy and security are airtight. CDAnet doesn't give the carriers one iota more information than they're getting now. The only difference is the one you've always looked for: accurate

"When I heard about CDAnet, I finally decided to stop dithering and get one of these computers. It's definitely the deciding factor."

Dr. Glenn Baron
Edmonton, Alberta



information delivered fast.

Your only cost on CDAnet is a computer. Once you're set up, all claims and required plan predeterminations are free. That's smart.

It's a Natural

If you're one of the 30 per cent of Canadian dentists who are already computerized, CDAnet fits into your existing software: if

your staff know your computer, they're practically ready to send claims on CDAnet right now. All you need is a basic software adjustment and some minimal training — both handled by a CDAnet-certified software vendor. There will soon be a network of certified vendors across the country waiting to connect you with CDAnet. Call one — and start collecting CDAnet benefits from the word go.

Privacy and Security

Only dentists understand the privacy and security concerns of other dentists. That's why CDAnet assures both:

- Carriers get their claim — and nothing else.

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- Every single claim has a transaction number, so it can be tracked down anywhere in the system, any time.

- The record of claims is owned and controlled by your provincial dental association, stripped of all identification except the dentist's (even that's removed at your province's request).

The CDAnet security guarantee? Nothing gets swallowed up. Nobody peeks in. Ever.

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Many of you have been weighing the costs and benefits of computers for some time. CDAnet is tipping the scales: in Ontario alone, about 50 per cent of non-computerized dentists are keenly interested in CDAnet. The reason? CDAnet pays off in speed and efficiency from day one.

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Here's the opportunity to find out more about

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Dr. Gary MacDonald
Executive Director
Newfoundland
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Specialty Features

Let Your Voice Do The Charting

For many years the Yellow Pages has encouraged us to "Let Your Fingers Do the Walking". Now a computer program lets the dentist's voice do the charting.

Simplesoft Voice Chart, developed by Avanti Computer Associates of Cherry Hill, New Jersey, and distributed in Canada by Ash Temple, records a complete dental examination unassisted, leaving both hands free. With a head-set microphone the dentist speaks the examination into the system without pen or paper (Fig. 1).

A total patient examination, it is comprised of head and neck, radiographic, restorative, TMJ/Occlusion, and periodontal examinations. The examiner has full sequence flexibility; all or any part of the examination can be performed at a patient clinical visit depending upon both parties' needs.

The technology is termed 'speaker-dependent voice recognition'. The system user must train his/her voice. The training process requires about an hour. The vocabulary of the system consists of approximately 100 standard dental terms with each voice command assigned a keyboard designation.

Examination data is displayed in a choice of two formats — graphic or numeric text. Choosing the proper mode can lead to an understanding of trends and occurrences that otherwise may not be obvious. All printouts are labelled with the date of the examination, the examiner's and the patient's names.

The color graphics resemble traditional dental charts and come in two modes — restorative and periodontal findings.

- the restorative charting shows all permanent teeth and their restorative status. Color codes can indicate caries, root canals, crowns, defective restorations, unerupted and impacted teeth, posts and implants (Fig. 2).
- the periodontal chart can voice record 800 separate items including gingival status, pocket depth, bleeding points, mobility, furcations and plaque deposition. A comparison in different color schemes of any two examinations can be overlayed one upon the other to determine the progress of disease (Fig. 3).



Fig. 1. The dentist "speaks" an examination without pen or paper.

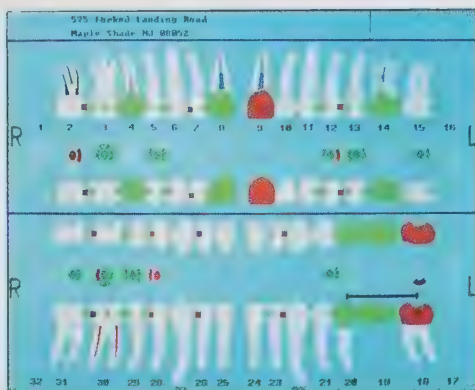


Fig. 2. Color coded restorative charting.

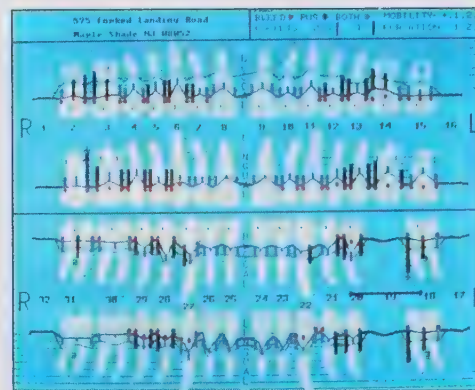


Fig. 3. Periodontal chart voice records 800 separate items.

Added to the obvious benefit of a "hands-free" examination, the computer activated examination appears to have a number of distinct advantages. All data is legible and available at a moment's notice for clinical use, referrals, patient education and third party requests. An interesting "time-clock" not only dates all input but also renders the entire system tamper proof — certainly of interest in today's litigious society. Δ

Did you know?

It's About the Government

"Parliamentary democracy is the worst form of government, except all others."

Winston Churchill



CANADIAN DENTAL ASSOCIATION

BE PART OF THE ACTION

Specialty Features

Dr. Malcolm Yasny (We should all read his mail!)

by P. Ralph Crawford, BA, DMD

Dr. Malcolm Yasny, a Toronto orthodontist, probably knows more of what the public thinks about dentistry than any dentist in Canada. What other dentist receives more than 20 letters per week on every conceivable topic? Some letters praise, few complain, most question. Collectively, Dr. Yasny's mail is a "window" into what the public thinks, feels, presumes and expects from the dental profession.

It all started when Dr. Yasny and the Canadian Association of Orthodontists became concerned with the enmity between orthodontists and general practitioners — both in the United States and in Canada. There was more and more emphasis from the profession challenging the "busyness problem" and associations began developing dental awareness campaigns.

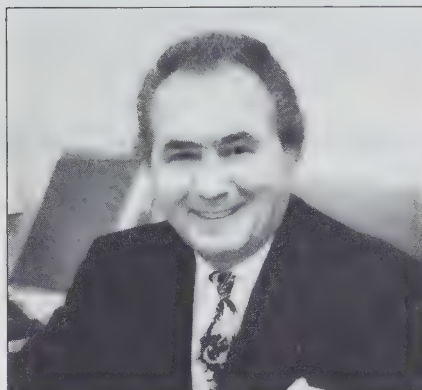
What was particularly irritating to the Canadian general practitioners was print advertising by the American Association of Orthodontists and published in Canadian magazines such as *Chatelaine*. The Ontario Association of Orthodontists set up a focus group to study the issue, to determine exactly where the problem existed, and to suggest a solution.

The solution became clear — communications — and Dr. Yasny, who received his DDS from the University of Toronto in 1952 and his orthodontic specialty from the same institution in 1954, soon found himself almost in the midst of a second career.

The Ontario Association of Orthodontists and the ODA's Professional Development Group sponsored a series of continuing education seminars for general practitioners.

These successful seminars not only aided in mending fences between the specialist and the GP but also emphasized that many groups within the profession weren't communicating all that well with the public.

It was evident a public information program was required. But any prolonged advertising campaign would be very costly — a method most dental associations could not sustain for long. In order to reach the Canadian public and growing



numbers of new Canadians, a more effective, economical approach needed to be found.

Initial response from ethnic newspapers and the *Toronto Star* indicated disinterest. However, within a year the Life Section of the *Star* underwent a total facelift. The Editor invited Dr. Yasny to consider writing a column.

At the outset, Dr. Yasny was commissioned to provide four columns in advance but also to provide 26 other topics. The managing editor (and other individuals) were sceptical. They felt a dental column may not be self sustaining. After all, what new facts on teeth could anyone talk about week after week! More than four years and 200 columns later, Dr. Yasny is still going strong and never seems to run out of material. A familiar lesson was reiterated — don't underestimate the reading public.

Dr. Yasny's "Your Teeth" in the *Toronto Star* is unique. It is the only weekly column specific to dentistry in all North America. And its fame is spreading. You can now read it in the *Edmonton Sun*, the *Lindsay Post* and in St. John, New Brunswick. The Nova Scotia Dental Association, of its own volition, is pressing for the column's appearance in a Nova Scotia paper. If the latter occurs, "Your Teeth" will have a circulation in excess of 1,000,000 per week (the *Star's* circulation is 800,000).

Asked if he has any set guidelines in writing the column, Dr. Yasny replied, "Not really. I have only one 'no-no' and that's politics. I feel the material must respond to what the public wants to know. I attempt to provide a message

that dentists do more than 'fill and bill' — dentists are proficient in all matters involved with the oral environment." Every column he writes ends with, "**The reader is strongly encouraged to see his or her own dentist for any individual dental problem.**"

It is evident Dr. Yasny has a natural talent for writing clearly and concisely. This was borne out shortly after his career began at the *Star*. "At first my material was closely edited but now they seem to leave me alone." When asked about his resource knowledge, he indicated a constant review of dental journals was imperative. Dr. Yasny also suggested he has never hesitated to contact dental specialists, research fellows and faculty members regarding any question of which he was unsure.

It is the flow of letters that provides Dr. Yasny with a continuous source of subject matter. He personally answers every letter posing a question; and just when he thinks he has heard them all, another bundle of mail crosses his desk. Nor is any subject particularly dominant. The public's curiosity regarding dentistry covers the entire gamut of the science. The two topics that stand out in Dr. Yasny's memory for eliciting the greatest response were over 250 letters from a column about a Non-Chew Cook Book, and over 200 letters on bad breath.

Even if no two problems are alike, there are two recurring themes in the letters from the public. Many indicate a high level of satisfaction and confidence in dentists. Only a mere handful out of thousands are negative.

To Dr. Yasny this very high rate of approval was somewhat of a surprise but nevertheless most gratifying.

The other statement that recurs with some frequency is, "My dentist never seems to have time to answer my questions," or "he doesn't really seem to explain my problems clearly enough."

A perusal of a small sampling of his mail (it had been carefully censored to protect the confidence the public places in Dr. Yasny) certainly provides the "window" referred to earlier.

- I am very worried and frightened to

ever visit the dental hygienist or dentist again because of the fear of getting AIDS. Recently I visited (the dentist's office) and I noticed that they use a funnel for the patient to spit into with water running continuously. The funnel isn't very large, so it's easy for someone to accidentally spit on the outside — this has actually happened to me. Do you believe the spittoon is less likely to spread the virus than the funnel?

- Unfortunately, after many years, our family dentist retired, and we now find his equipment was a little out-of-date, specifically his chair. Trying to find a dentist with an old-fashioned chair is becoming difficult. This idea of relaxing in a so-called contour chair is inconceivable to me. Are there any dentists still around who let one sit reasonably upright?
- I had a bout with periodontal disease last year. By vigorously cleaning and brushing between the teeth I got rid of it all. However, I also made a perforation into my sinus cavity between my 7th and 8th upper teeth. My dental surgeon suggested removal of those teeth and sewing it up. I did not consent to this drastic measure, since there was nothing wrong with the teeth. I would like to know what other choice I have to close this perforation, which doesn't make me sick, but causes occasional discomfort. What dental specialist should I see?
- I need to know where I can buy a book or booklet that details the effect of dental infection on the rest of the body. I don't have any teeth left. They're either rotted out, leaving only roots, or broken off at the gums. I'm trying to find out what kind of damage all that slop draining from the teeth and gums does to the whole system.
- Not all dentists perform as you think, but I hope the majority do. My dentist does not like removing plaque and tartar, and also says he does not have the time (not very fair to patients who have great faith in their dentist!). I am of the opinion that it is not compulsory for a dentist to remove tartar and plaque. I enjoy your column in the *Star* very much.
- When I smile the fillings in my upper teeth really show and I am getting more and more self-conscious. Is there bonding that can be applied just where the black fillings show the most? My dentist said he could do nothing about it and doesn't advise replacing them with white fillings. I continually hear

and read about how advanced dentistry has become. I need some advice on cosmetic dentistry . . . before I completely lose my smile to a self-conscious grin. . . Can you let me know when your answer to this will appear in the *Star* so that I don't miss it, or send it to me?

A conversation with Dr. Yasny clearly indicates that the column in the *Toronto Star* fills only a small part of his busy life. A private practitioner for over 36 years, he also shares his time and expertise with

the University of Toronto where he presently serves as the Director of Alumni Affairs. And as if he didn't have enough to do, he currently serves as president of the Canadian Association of Orthodontists.

When asked whether he is thinking of retiring, there is a quick response, "No thought at all — I'm having too much fun!" It would be dentistry's loss, if Dr. Malcolm Yasny ever decided to retire. His "window" into the public's perception of the dentist is very valuable to the dental community. Δ

Did you know?

It's About the Government

"If coalition between two parties means that for the sake of emolument or position they sacrifice principle, then coalition government ought not to receive the confidence of the people. But if it means the junction of a number of men, who, forgetting old quarrels which have been wiped out, and which instead of raking up the ashes after the dissension had burned away, finally extinguished it, and refused to prolong discord — then I say that coalition is the act of true patriots".

Sir John A. MacDonald (1815-1891)

CDA Retirement Savings Plan

Unit values: (Funds are valued weekly)

Fund	Unit values as at	
	September 30, 1990	August 31, 1990
Bond & Mortgage Fund	73.50127	74.83778
Common Stock Fund	15.06013	15.64530
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Balanced Fund	28.77824	29.58407

G.I.C. Fund Term	*Interest rates as at	
	September 30, 1990	August 31, 1990
1 yr	11.80%	12.15%
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3 yr	11.45%	11.75%
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(*rates subject to change without notice.)

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The Endo-Perio Problem in Dental Practice: Diagnosis and Prognosis

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SUMMARY

The relationships between endodontics and periodontics are explored. Diagnosis, prognosis, and treatment planning are discussed for the primary endodontic lesion and the primary endodontic lesion with secondary periodontal involvement.

These endodontic lesions are compared with primary periodontal lesions and primary periodontal lesions with secondary endodontic participation.

The "true" combined lesion is also reviewed. Clinical photographs and radiographs are used to illustrate specific aspects.

SOMMAIRE

Dans cet article, on étudie les rapports entre l'endodontie et la périodontie. Il y est question du diagnostic, du pronostic et du plan de traitement pour les lésions endodontiques primaires et pour celles qui ont des effets secondaires sur le parodonte.

On compare aussi ces lésions endodontiques aux lésions parodontales primaires et à celles qui ont des effets secondaires sur l'endodonte.

Enfin, on parle de la « vraie » lésion combinée. Et pour illustrer certains points précis, on a recours à des photographies et à des radiographies cliniques.

Introduction

There are few specialties or areas of specialty dental practice that are as intimately related as Endodontics and Periodontics. When disease appears in the periodontal ligament, it may originate in the pulpal tissues and spread apically from an infected root canal or extend from the marginal gingival tissues and spread around the tooth. When lesions due to inflammatory products are found in varying degrees in both the periodontium and the pulpal tissues, the term

periodontal-pulpal disease is used. The complex is then sometimes referred to as the endodontic-periodontic continuum,¹ because of the close relationship between the two types of disease processes as found in the periodontal ligament. Since there is a similar embryonic origin for periapical periodontal tissue and marginal periodontal tissue, it is not surprising that there could be a pathogenic relationship between the two areas.² Although there may be times when disease and treatment of endodontic and periodontal lesions per se may progress independent of each other, undoubtedly at other times the close endodontic-periodontic relationship must be recognized. Earlier reports recognized the need to treat both aspects of the combined disease for successful resolution of the lesions.³

The subject of this review will be the relation of lesions of endodontic origin and lesions of periodontal origin in respect to diagnosis, treatment planning, and post-treatment prognosis. Sometimes periodontal treatment will require concomitant pulpal management; for example to allow for the management of furcation invasions. That topic is the subject of another review.

Classification of endo-perio lesions

A very simple, logical, and clinically workable classification of the relationship of endo-perio lesions was first proposed by Simon, Glick and Frank in 1972.⁴ Their classification describes endodontic lesions with a basically normal periodontium which is briefly affected by inflammatory changes from the primary endodontic lesions. A second stage is the primary endodontic lesion with secondary periodontal involvement which has developed because of an extension of, and long duration of, the pulpal pathology. On the other side of the equation are primary periodontal lesions with transient effects on pulpal tissue. Also

there is periodontal disease which, due to chronicity of the periodontal irritation, results in secondary pulpal necrosis. The classification recognizes the "True" combined pulpal-periodontal lesion which is a simultaneous occurrence and progression of endodontic and periodontal pathology. (A diagram of their classification is presented in figure 1.) Resolution of the combined endodontic-periodontal lesions will not occur unless both aspects of therapy are considered, usually with endodontic treatment preceding periodontal treatment.²

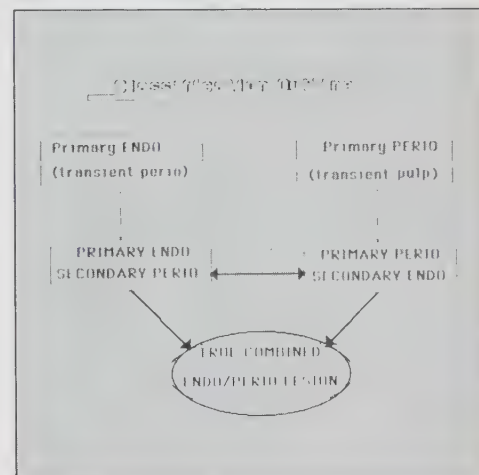


Figure 1: Classification outline

A true endo-perio lesion, as described by Harrington,⁵ comprises three criteria. The tooth must first be "pulpless"; there must be periodontal destruction which originates at the gingival sulcus, and a pocket must be present which extends to a lateral canal or to apical foramen levels. Resolution of the lesion will not be expected to progress unless both endodontic treatment and periodontal therapy are done concurrently.

While the classification of an endo-perio lesion may seem to be academic, an accurate diagnosis and treatment rationale is needed if treatment is to be expected to be successful with any degree of consistency. Primary endodontic lesions should be expected to resolve,

along with periodontal manifestations, once the root canal system is disinfected and sealed. Secondary periodontal involvement will require periodontal therapy only if the lesion has been long standing and has developed into an infected periodontal pocket. Without the detrimental effect of toxins from the portals of exit from the pulp space, the bone levels and periodontal health are expected to return to normal.

Conversely, periodontal disease, which may affect the pulp secondarily, should not have irreversible pulpal effects if managed conservatively. However, if exposure of furcation canals, large lateral canals, or even aggressive root planing results in chronic bacteria and toxins ingress into the pulp space, degeneration of pulp cells may result. Endodontic therapy would be required to supplement the periodontal treatment.

Teeth which are undergoing periodontal management of their supporting structure, and subsequently develop pulpal pathology from a different etiology such as caries, trauma, or related restorative procedures, are not included in the endo-perio classification. Similarly, teeth with successful endodontic treatment which develop unrelated periodontal disease later should not be confused with endo-perio problems.

Diagnostic aids in the differentiation of endo-perio lesions

The choice of proper diagnostic tests, the method of application of the tests, and the interpretation of clinical tests are important in arriving at a diagnosis and prognosis for endo-perio lesions.

The differentiation between lesions of endodontic origin and periodontal lesions depends largely on a determination of pulp vitality and an examination of the location of pockets and the extent of pocket probing depths. If the pulp reacts clinically normal, but a periodontal pocket can be located, then periodontal tissues should be suspected as the origin of either the acute or chronic inflammatory process. On the other hand, when the contents of the root canal system, or even one portion of a multicanal system are found to test nonvital, the inflammatory process which passes through a lateral canal or the apical foramen will cause a lesion of endodontic origin. It is when these two processes are present at the same time that the disease is classified as an endo-perio problem. The correct diagnosis of these endo-perio problems is most important so that

appropriate treatment can be prescribed. Attention must then be paid to the following tests when doing an examination.

Pulp vitality tests

The electric pulp tester therefore becomes an important diagnostic tool in determining pulp vitality. When properly applied to enamel with vital dentine underneath, the electric pulp test (E.P.T.) should be the first test used in trying to determine vitality of the pulp tissue. The new digital pulp testers have been found to be more convenient to use than previous manual types.⁶ When rubber gloves are worn during the testing procedure, the patient should touch the electrode to complete the circuit and move the finger away when a tingling sensation is felt.⁷ It is generally understood that the level of reading on a pulp tester cannot diagnose the degree of inflammation or disease of the pulp, but a response in the clinically normal range should indicate pulp vitality.⁸ A negative response most likely indicates a necrotic pulp, at least in the chamber. Other signs and tests should be taken into account to confirm this finding.

In certain conditions, such as under a full crown coverage or after subluxation trauma, it is difficult to carry out an electric pulp test. The cold test may then be required to test for pulp vitality. A plastic anaesthetic cartridge can be filled with sterile water and frozen before use. When the frozen icicle is removed or partially extruded it can be applied to the crown of the suspect tooth, the pulpal temperature may be lowered enough to get a pain response. Alternately, a carbon dioxide "dry ice" stick or commercially prepared refrigerant can be used to test for a cold response.

There are a few cases in which E.P.T. and cold test may both be negative and still not be conclusive of a nonvital pulp. Deeply based acrylic restorations and crowns, which are not as conductive as metal restorations, can prevent a positive cold response. A cavity test in these cases may be the last resort in determining the vitality of the pulp.

The heat test, whether a heated gutta percha stick, a hot burnishing instrument, or hot water lavage is generally a test to isolate a tooth which has irreversible pulpitis. Positive signs and symptoms found as a result of this test are much different than those found in periodontal pain. Irreversible pulpitis is generally an acute disease, and if found in association with pre-existing chronic periodontal disease, may be considered secondary to the latter.

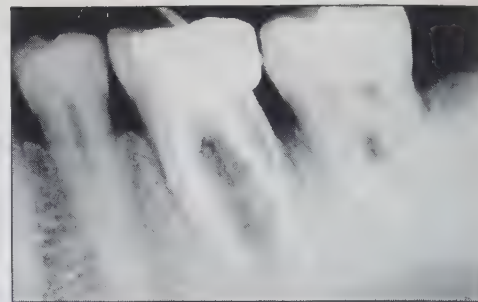


Figure 2: This mandibular left first molar (international code #3-6) exhibits an example of an endo-perio lesion. Irregular probing depths around the second molar and a narrow defect on the distobuccal line-angle of the first molar would lead one to suspect a periodontal origin until a gutta percha point was placed in the pocket and a radiograph taken. This showed an oblique root fracture, diffuse bone loss around the distal root, and no periapical areas, for a diagnosis of split root.

Periodontal tests

The palpation test, when used very carefully, can localize the area of sensitivity in acute inflammation. Lesions of endodontic origin are generally sensitive in the periosteum immediately over the apex of the root, which is located deep in the vestibular sulcus. Periodontal abscesses can sometimes be localized, at a more marginal location. Lesions of endodontic origin from a lateral canal, however, may point in much the same direction. In chronic disease states, this test is not very conclusive.

The percussion test, likewise, only indicates severe inflammation in the periodontal ligament. The source of the inflammation could be through an apical foramen, through a lateral canal, or from around marginal periodontium. The percussion test is useful only in estimating the acuteness of the lesion, and will not apply in chronic states. Early adult periodontitis, chronic apical periodontitis, and even suppurative apical periodontitis with a fistula tract may all present without any marked percussion sensitivity.

The tracing of a fistula tract with a fine gutta percha point should be a *required test* whenever a fistula is noted on examination. This test is also necessary when checking for a suspected split root or other true combined endo-perio lesions. In this test, a fine but flexible point is teased along the side of the root in the area of the defect or through the path of the fistula drainage until sensitivity is felt. A radiograph is taken and the origin of the inflammation, whether periodontal or pulpal, can be traced.

Periodontal probing of pockets and furcation invasions should be used to determine the cause of an endo-perio problem.

Near normal probing depths around the crown of the tooth, with one deep pocket may indicate a split root (**Figure 2**) or a developmental groove related defect commonly found on the lingual root of maxillary lateral incisors (**Figure 3**). Endodontic drainage via the gingival sulcus from a high lateral canal may also be located in this manner.

The presence of subgingival calculus deposits and the degree and location of inflammation, are important to note in determining the primary source of the disease.

Increased probing depths are found in periodontal disease. If found in the absence of caries or large restorations, but in association with a nonvital pulp, the lesion would probably be classed as a primary periodontal lesion with secondary endodontic complications (**Figures 4a,b,c**).

Tooth mobility tests are also important to use in assessing the periodontal or endodontic component of the endo-perio problems. Only in an acute apical abscess will a lesion of endodontic origin cause more than Grade I mobility. If crestal bone levels are normal, then minor differences in mobility can sometimes be used to demonstrate apical bone loss or increased inflammation in a suspected endodontically involved tooth in the arch. Endodontic mobility, since it is fairly subtle, is difficult to detect however.

The increasing grades of mobility in periodontal disease reflect the degree of inflammation, the amount of bone loss and the remaining bone support for the tooth. Increased mobility of a tooth, in the absence of clinical endodontic symptoms and occlusal traumatism, would indicate periodontal origin of the lesions. In some true combined endo-perio lesions there may be little change in mobility in early stages as most of the attachment apparatus is unaffected (**Figure 2**).

Radiographic interpretation

Although a diagnosis cannot be made from a radiograph alone, some helpful determinations can be made on the radiographic appearance of a lesion. Lesions of endodontic origin are usually centered around the apex of a root and are confined to bone. Periodontal lesions, on the other hand, are often located around the cervical area of the tooth. A split root develops a characteristic diffuse bone loss pattern along the split with loss of lamina dura when the radiograph is angled appropriately (**Figure 2**).

A split root in later stages will show a large combined radiographic area and the root fragments may even be separated (**Figure 5**).

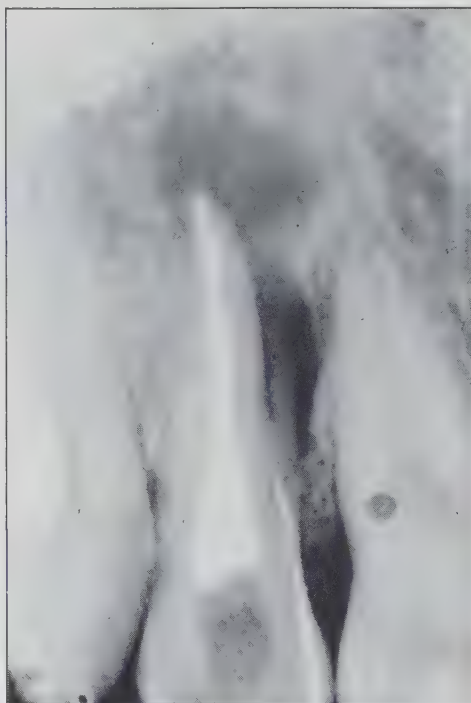


Figure 3: A radiographic picture of the lingual groove defect on tooth #1-2 is seen on this referral radiograph. Recurrent swelling after root canal treatment was completed was due to a deep lingual periodontal pocket. A gutta percha point placed in the lingual gingival sulcus follows the radicular defect in this combined lesion.

Furcation bone loss on a nonvital tooth, when bone levels are normal elsewhere, would make us suspect drainage from furcation canals and a primary endo and secondary perio lesion. A true combined endo-perio lesion should show signs of both periapical and periodontal bone loss and not just a fortuitous overlapping of images.

Primary endodontic lesions

In the presence of an acute apical abscess, the entire tooth becomes mobile and feels high in occlusion. The inflammation is not confined to periapical tissues and spreads throughout the periodontal ligament. Even the marginal periodontium is affected in this acute endodontic disease, but this should reverse once the apical abscess is drained (**Figures 6a, b**).

The same can probably be said for the lateral canal or the furcation canal that drains initially through a fistula or via the periodontal ligament. The presence and frequency of these areas of communication between the pulp space and furcation areas^{9,10,11,12,13} and on lateral root areas^{12,14,15} are well documented in the literature. Once the portals of exit are sealed with endodontic therapy, the lesions will resolve without the need for periodontal therapy¹⁶ (**Figure 7**). The permeability of bacterial toxins or similar



Figure 4a: Tooth #2-4 had been treated with periodontal surgery in the previous year and had developed chronic drainage through a raised epulis area on the attached gingivae. The first premolar tested nonvital despite having an intact crown before access opening was made.

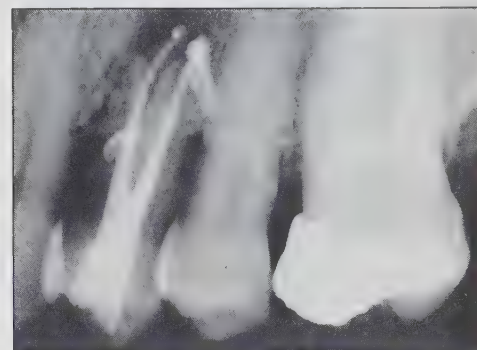


Figure 4b: A large midroot lateral canal on the buccal root was filled with sealer as well as inadvertent extrusion through the apex during vertical condensation with gutta percha. The fistula had closed and the epulis had receded.

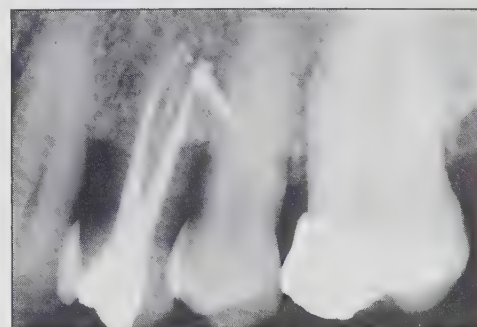


Figure 4c: On a one-year recall of the previous tooth, the apical area had resolved and the apical excess was encapsulated. The lateral canal, which became exposed during bone recession because of periodontal disease, was the primary cause of a secondary pulpal lesion.

antigens from the pulp space through dentinal tubules and intact cementum to affect the peripheral periodontal ligament has long been debated. Seltzer¹⁷ demonstrated that there are numerous communications of a larger diameter in the form of furcation canals and lateral canals that can adversely affect the health of the periodontium. Hiatt¹⁸ first reported that drainage from a nonvital pulp via the apical foramen and through the gingival sulcus could be responsible for secondary periodontal disease. Early interpretation

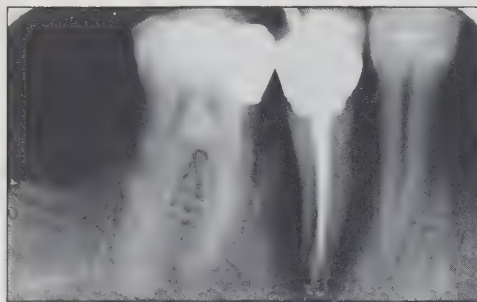


Figure 5: Periodontal destruction after a post endodontic treatment is characteristic of a split root in late stages. A gutta percha point was made to track down a thin walled gingival defect. The radiograph shows the apical split and characteristic halo effect. Extraction of the tooth with a hopeless prognosis was advised.

of this may have even resulted in attempts at intentional pulp treatments to resolve intractable periodontal conditions.¹⁹

In comparison to lateral canals, permeability of dentine of toxins from the pulp space must be minimal. Studies have shown that intact dentine is relatively nonpermeable until cementum and peripheral root dentine layers were removed²⁰. A case report by Cambruzzi and Greenfeld²¹ also demonstrates that excessive intracanal formocresol can permeate a thinned layer of coronal dentine in concentrations enough to cause necrosis of crestal bone. If root dentine is intact, then permeability is probably not enough to cause periodontal inflammation by itself. Inflammatory bone loss adjacent to the periodontal ligament probably occurs only in relation to a lateral or furcation canal.

Endodontic bone loss in the furcation area because of large furcation canals and a necrotic pulp, if noted on the radiograph alone, may then be misdiagnosed as a periodontal problem (**Figure 7**). If there are no signs of split root or periodontal pockets coexisting with the root canal therapy, then some attempt at sealing the floor of the chamber during root canal treatments should be done. The bone defect should resolve with the same favourable prognosis as any periapical area of endodontic origin.

The final case of periodontal involvement of a primary endodontic problem would be iatrogenic invasion of the periodontium during root canal treatment. Perforations into the furcation during access opening and strip perforations during instrumentation of curved canals are difficult to disinfect and equally difficult to seal. Failure of these cases usually manifest themselves as periodontal defects. The prognosis is poor in these cases and depending on the level of the root perforation may only be salvaged

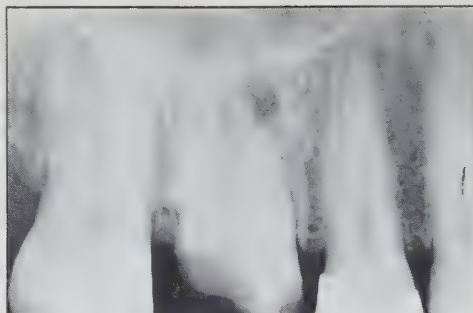


Figure 6a: Tooth #16 had a large amalgam fracture involving the entire crown, mobility of +1, marginal gingival inflammation, and moderate pocket depths which indicated periodontal involvement. However the nonvital pulp tests and periapical radiolucencies point to a primary endodontic origin of the lesion.

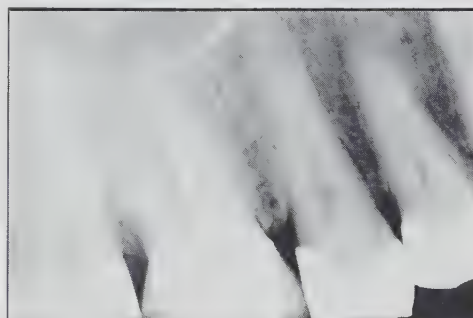


Figure 6b: The same tooth as previously pictured on a two year recall exhibits apical bone regeneration and a well-contoured crown after only periodontal contouring and endodontic therapy. The bone levels and possible pocketing around the distobuccal root will require further periodontal management.

with the aid of periodontal surgical therapy.

Primary endodontic lesions with secondary periodontal involvement

This condition can occur when acute periapical drainage becomes chronic and continues to drain through the gingival sulcus. Periapical abscesses on mandibular molars will sometimes drain through the furcation and into the attached gingiva via the sulcus. Secondary periodontal disease can occur if bone loss persists and epithelialization of the tract results in a periodontal pocket. Periodontal therapy is often necessary in a chronic or neglected lesion after the root canal treatment has been completed. Through the process of time, these lesions will become combined lesions.

The palatal root of maxillary molars is another area where secondary periodontal problems occur in association with long standing periapical lesions. Bone dehiscences probably are present over these roots. Periodontal treatment success rates are often low even with prior endodontic treatment (**Figure 9b**).

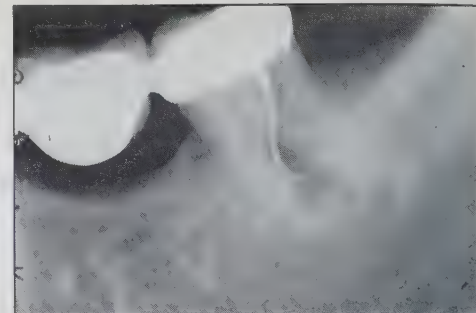


Figure 7: A tentative diagnosis of periodontal furcation involvement was made from the original radiographic appearance of the bone loss which was confined to the furcation area on this tooth. Before referral, endodontic access was made and only the distal root canal was located. Drainage continued from the furcation area as demonstrated by a gutta percha point which extends from the gingival sulcus to the mesial root area.

Primary periodontal lesion

A moderate-to-deep periodontal pocket after infection by dental plaque shows the characteristics of a longstanding inflammatory process. The signs and symptoms are bleeding upon probing the base of the pocket and sometimes the appearance of purulent exudate after pressure is exerted on the marginal and attached gingivae. Swelling of the gingivae is limited, but a change in colour of the tissue from pale pink to dark red or magenta is characteristic of the lesion. A lack of significant swelling and pain differentiates the longstanding infected periodontal pocket from an acute periodontal abscess.

Although chronic periodontal disease seems to be cyclic in nature,^{22,23} a lack of treatment will eventually result in progression.²⁴ This can mean advanced bone loss and extension of the lesion to the root apex of the tooth. At all times, the periodontal pocket can be probed. Deviation from a clinically normal pulpal reaction and the ability to probe a periodontal pocket are critical factors for the differentiation between the endodontic and periodontal components of a lesion.

Thermal and electric pulp testing are used to determine the vitality of the pulp. Increased thermal sensitivity, particularly to cold fluids, on a periodontally involved tooth is likely a sign of transient pulp involvement in these cases.

Pulp vitality is critical and at all times the periodontal pocket will be probeable in the differential diagnosis between a primary periodontal lesion and a primary endodontic lesion with secondary periodontal involvement (**Figures 8a,b**).

The prognosis for the tooth depends on the periodontal condition and especially on its duration and the extent of the bone loss caused by the infection. The prognosis for the pulp is usually good unless

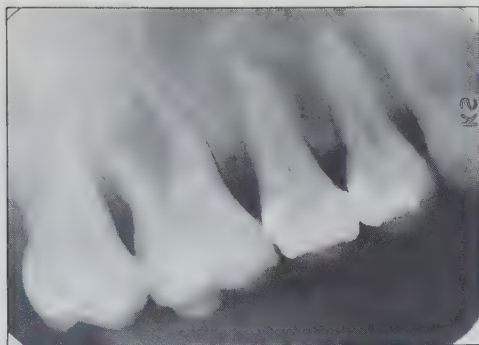


Figure 8a: Vital pulp responses and a shallow caries control in the distal groove on tooth #1-6 lead to a diagnosis of primary periodontal lesion for the swelling and occlusal interferences the patient was experiencing. Increased sensitivity to cold and diffuse periodontal ligament thickening indicated secondary pulp involvement.

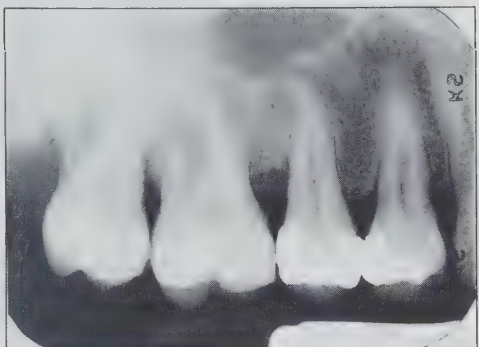


Figure 8b: After periodontal therapy of the supporting tissues, including the furcation area and occlusal adjustment, bone is seen to regenerate without need for pulp therapy at present.

lateral canals are exposed to the oral environment (**Figure 4a**). Early intervention and limited bone loss with no mobility of the tooth may result in a good post-treatment prognosis, while late intervention in the presence of extensive bone loss and mobility results in a guarded or poor periodontal prognosis for the tooth (**Figures 9a,b**).

Primary periodontal lesions with secondary endodontic involvement

Bender and Seltzer²⁵ found more pulpal changes in teeth with periodontal disease than in teeth without periodontal changes, although earlier studies could not corroborate this finding.^{14,26} The direct influence of an infected periodontal pocket on the pulpal tissues is limited by the ability of toxic products of the dental plaque to permeate the exposed cementum and dentine.²⁷ In addition, dentinal tubules and lateral canals may be opened during the course of periodontal treatment by scaling and root planing and evoke pulpal changes (**Figures 10a,b**). Progression of a periodontal lesion to the apex over an extended period of time will

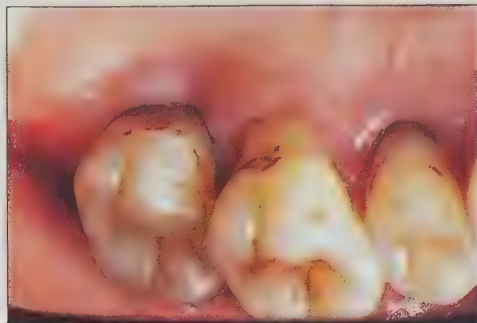


Figure 9a: Clinical example of #1-7 (mirror view) of advanced adult periodontitis with subgingival calculus extending along the palatal root.

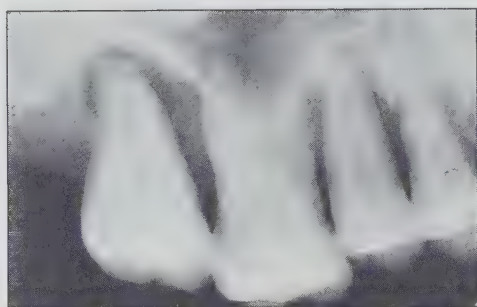


Figure 9b: The radiograph of tooth #1-7 from the same case above which shows a primary periodontal lesion with secondary pulpal signs and markedly advanced bone loss extending to the periapical region.

most likely result in pulp vasculature changes and possible necrosis.²⁸

The history of the lesion, and periodontal probing in combination with testing of the vitality of the tooth, are the main diagnostic tools that can be used to make a differential diagnosis. Since the pulp may be either partially or totally necrotic, a false reading is not an exception.

The treatment of periodontal lesions with secondary endodontic involvement should be first directed to the most acute component of the condition. Frequently, this is the endodontic problem which must be then followed by periodontal therapy.

Tooth hypersensitivity as a result of periodontal scaling and overzealous root planing, and after periodontal surgery, is well known. This sensitivity is in general contributed to the opening of dentinal tubules, and a chronic irritation as a result of a diffusion of bacterial toxins and antigens from the plaque into the pulp. The irritation may lead to a lowering of the irritation-threshold and may cause discomfort especially with the use of cold liquids and foods. Sealing of the root surface by a variety of techniques has shown to have satisfactory results in not-too-extreme sensitivity cases.

Extreme dentinal sensitivity which can-



Figure 10a: Lower anterior tooth #4-1 had an intact crown but had been root planed many times in the course of continuing periodontal maintenance therapy. Although the pulp was never exposed, chronic percolation through open dentinal tubules resulted in a nonvital pulp and a periapical area developing at the apex.



Figure 10b: Endodontic therapy was completed for the necrotic pulp of tooth #4-1 as a result of a primary perio/secondary endo lesion.

not be managed with the application of dentine desensitizers, may be an indication of irreversible pulpal changes. Teeth with this pulpal-periodontal sensitivity may require elective endodontic therapy.

The prognosis of the primary periodontal lesion with secondary endodontic involvement depends mainly on the extent of the periodontal condition and the outcome of periodontal therapy. The prognosis can vary from good to poor.

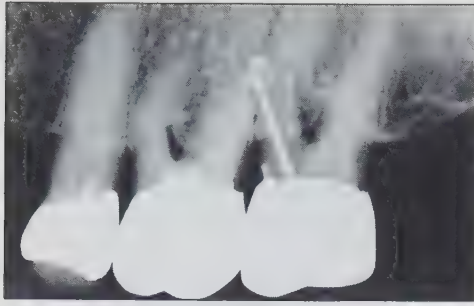


Figure 11: A combined endo-perio lesion was diagnosed when a gutta percha point was inserted in a fistula and ended at the apex of the distobuccal root of tooth #2-6. Periodontal bone loss existed before the pulp became necrotic.

“True” Combined endo-perio lesions

Despite the many classifications of pulpal-periodontal disease in the literature and the difficulty in deciding which came first in some cases, there is a place for diagnosing the combined lesion. The pulp should test nonvital to thermal and electric pulp tests and necrotic tissue found upon entering the pulp chamber. Periodontal probing should reveal a pocket which may extend to the apical region. On the radiograph, a gutta percha point may be seen to penetrate to the root apex and the periapical area will be seen to have coalesced with lowered bone levels. Mobility will likely be marked because of bone loss in both apical and marginal areas (**Figure 11**).

Treatment of the combined lesion is more complicated than treatment of primary lesions. Both the endodontic and periodontal phases of treatment must be co-ordinated for optimal results. Periodontal surgery to facilitate root planing and reattachment procedures generally follow sealing of the root canal. At times, the treatment plan calls for hemisection and extraction of the involved root in mandibular molars or resection and crown contouring of maxillary molars. Some combined lesions may even have a hopeless prognosis depending on the bone support and healing potential.

Endodontic treatment should proceed first with the view to eliminate all bacteria and antigens from the infected root canal system. The use of intracanal calcium hydroxide has been advocated as a medicament for a number of reasons and its use may be indicated in pulpal-periodontal disease.²⁹ Studies³⁰ have shown that endodontic medicaments can influence marginal healing and repair, and that canals should be sealed with an inert gutta percha and sealer combination before cementum is removed. Without



Figure 12a: A periodontal abscess on the palate due to a lingual groove defect is shown on this photograph of a right lateral incisor.

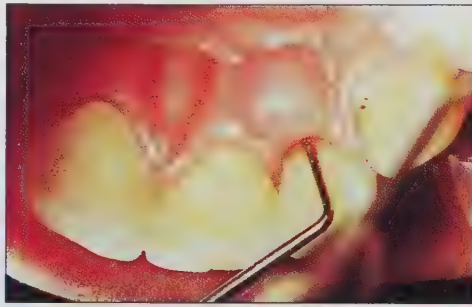


Figure 12b: Periodontal probing demonstrated an 8mm pocket on the lingual aspect. Pulp tests were vital.

the continued irritational stimulus of a necrotic pulp from apical foramen, apical deltas, and lateral and furcation canals, the lesion remains primarily as a periodontal management problem. This means that calculus and plaque deposits have to be removed before or during periodontal surgery. This may include also regenerative therapy. The object is to repair or restore the periodontal attachment apparatus.

Prognosis of a combined endo-perio lesion is usually moderate to poor, considering the chronic nature of the lesion and the amount of alveolar bone loss. Periodontal surgical procedures are almost always called for, and at times, the anatomic complexities of the root apex call for root resections, despite three dimensional root canal fillings.^{31,32,33,34,35}

The lingual groove, found as an anatomic variant on the crown and root of maxillary lateral incisors, could be classified as a combined endo-perio lesion when pathology occurs around these roots.³⁵ Histologic studies of failure of endodontic treatment of these teeth³⁷ show that the groove often communicates with the pulp tissue. After these teeth have erupted, a periodontal pocket may form because of plaque entrapment in the deep groove. The result is both pulp necrosis and an untreatable periodontal pocket, a combined endo-perio problem with a poor prognosis (**Figure 3**).

There have also been case reports³⁸ which show that the groove may not

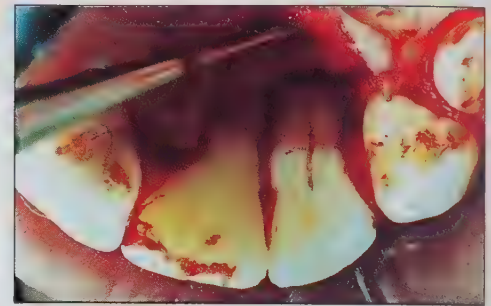


Figure 12c: A periodontal flap was elevated and granulation tissue was curetted from this deep defect. Pulp vitality will have to be monitored.

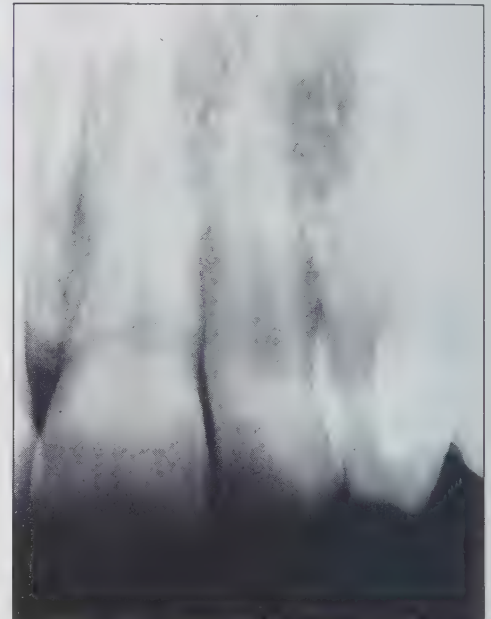


Figure 12d: The radiograph of tooth #1-2 shows periapical bone within normal limits, a diffuse mid-root radiolucency, and no restoration on the crown. A shallow lingual groove is barely discernible on the cingulum area.

extend from the crown into the root surface or that the root surface groove may be shallow and does not communicate with the pulp tissue. These teeth will have vital pulps and the periodontal defect may be manageable with surgical examination and correction (**Figures 12a,b,c,d**).

The final example of a combined endo-perio lesion is the split root syndrome. When it was first reported by Cameron³⁹, the potential for subsequent periodontal problems did not seem to be recognized. Later reports⁴⁰ recognize that as well as the pulp becoming nonvital and requiring root canal therapy, the crack often progressed into the root even under full coronal coverage. Failure in these cases occurs not because of inadequate root canal seal, but because of a deep one-sided periodontal pocket which follows down the crack surface. Early treatment of a cracked cusp may confine the crack to the crown where it may be manageable

with endodontic treatment followed quickly by full coronal coverage. However, when the crack is seen in the inner root surface and it becomes a split root situation, then the prognosis is poor. Any case which has a combined endo-perio lesion because of a split root has a hopeless prognosis (Figures 2,5).

Conclusions

The common embryonic origin of the pulp, the periapical periodontal ligament, and the marginal periodontium make these tissues a target for similar reactions to an inflammatory stimulus. When lesions are found in both pulpal and periodontal tissue, they are classified as endo-perio problems. The primary origin of the lesion can sometimes be determined after a careful examination and diagnosis. Since the root canal system can be considered an enclosed space, the prognosis for primary endodontic lesions is good. Periodontal lesions are open to the oral environment and must be managed, after endodontic treatment is completed, in combined lesions. The more chronic or longstanding a combined endo-perio lesion, the poorer the prognosis will be. Teeth with combined lesions, which are the result of a split root or because of anatomic variants, have a hopeless prognosis.

Many review articles can be found in the literature which classify the endodontic-periodontal relationship and which present examples of case reports.^{1,4,5,41,42} The general practitioner should be aware that there may be a relation between endodontic and periodontal problems and may want to refer difficult cases to a specialist. Δ

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Provisional Government of the Northwest Proclamation, December 8, 1869, signed by John Bruce and Louis Riel.



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Perspectives, Controversies and Directives on Pulpal-Periodontal Relationships

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ABSTRACT

While established clinical, radiographic and histologic criteria exist to explain the intimate relationship of the pulp and periodontium during pathological states, the recognition, diagnosis and treatment of this perplexing interplay remains a challenge for the practitioner. This dynamic interrelationship is investigated with a focus on simplicity and succinctness to enhance diagnostic probabilities, clarify treatment modalities and provide realistic prognoses in management.

SOMMAIRE

Bien qu'il existe des critères cliniques, radiographiques et histologiques pour expliquer le rapport étroit entre la pulpe et le parodonte durant les états pathologiques, la reconnaissance, le diagnostic et le traitement de cette interaction compliquée constitue un défi pour le praticien. Dans cet article, on étudie ce phénomène en visant la simplicité et la concision afin de pouvoir accroître les probabilités du diagnostic, préciser les modes de traitement et fournir un pronostic réaliste touchant la gestion des cas.

Introduction

The interrelationship between pulpal and periodontal disease is genuine and was historically demonstrated using radiographic, histological, and clinical criteria.¹⁻³ In 1886, Dr. G.V. Black¹ was cognizant of this interrelationship as he practised and recorded root amputations and crown contouring techniques to retain parts of teeth that normally would have been condemned. However, over the years this relationship has been both

confirmed and denied by numerous investigators, using a wide variety of evaluative methodologies and parameters.²⁻¹⁴

In the 1920s Cahn² and others had identified that "pyorrhea alveolaris" caused histologic changes in the dental pulp, such as calcifications, fibrosis, and cystic degeneration. At the same time, however, little was written concerning the diagnosis and management of this interrelated entity, other than that teeth having this mutual problem were to be extracted based on a poor prognosis for retention. This was especially true if a periodontal pocket united with a periradicular lesion of pulpal origin. The various diagnostic and clinical aspects of this problem still face practitioners who attempt to accurately manage these cases. The purpose of this paper is to provide a contemporary review of the basis for and against the presence of interrelated pulpal and periodontal disease states; to examine the potential pathways which may contribute to this interrelationship; and, to integrate this information into a repair-predictive, treatment-oriented, approach to diagnosis.

Pulpal-periodontal interactions

Pulp tissue succumbs to degeneration via a multitude of insults, such as caries, restorative procedures, chemical and thermal insults, trauma and periodontal disease. When products from pulp degeneration reach the supporting periodontium, rapid inflammatory responses can ensue which are characterized by bone loss, tooth mobility and sinus tract formation. If this occurs in the apical region, a periradicular lesion forms. If this occurs with crestal extension of the inflammation, a retrograde periodontitis or reverse pocket is formed.⁶ However, the lesion formed has little anatomical similarity to a periodontally induced defect.

Periodontal disease, on the other hand, is generally a slow developing process which has a gradual atrophic effect on the dental pulp. Reports^{5,8,12,14-18} have identified the presence of inflammation, localized tissue infarction, fibrosis, a decrease in cells, resorptions, coagulation necrosis and dystrophic calcification in the pulps of teeth with surrounding and influencing periodontal disease. Additionally, periodontal procedures such as deep scaling and curettage,^{5,10} with the use of localized medicaments,⁵ and gingival injury or wounding¹⁵ may enhance further pulpal inflammation and perpetuate the interrelated disease process.

Pulpal and periodontal disease states have been created and studied experimentally in the teeth of monkeys, dogs and man over the past 30 years. However, a true and unquestionable consensus has not been identified regarding the relationship of these disease processes, especially as it applies to the human model.

The most intimate and demonstrable relationship between the two tissues is via the vascular system^{10,19-22} as demonstrated anatomically in the presence of the apical foramen and aberrant, accessory communication.^{8,23-26} These channels, when patent, may serve as potential routes of inflammatory interchange. Still other channels, covered by cementum, may be exposed during scaling or other periodontal therapeutic procedures.¹⁰ A major concern, however, is the fact that it is unknown to what extent these vascular communications must be disrupted to cause a resultant, overwhelming disease process.¹⁴

Although the focus of communication between the pulp and periodontium focuses on the vascular route, many other viable avenues exist. The following anatomical entities or pathways must be considered in the exchange of inflamma-

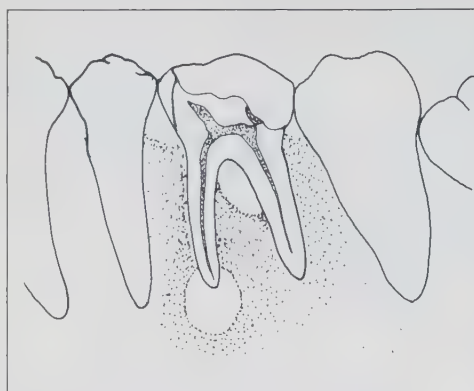


Fig. 1A Diagrammatic representation of a lesion of primary pulpal origin. Long term inflammation via either recurrent decay, previous pulp cap or the pushing of debris into a pulpal exposure has resulted in a necrotic pulp with evidence of furcation bone loss.

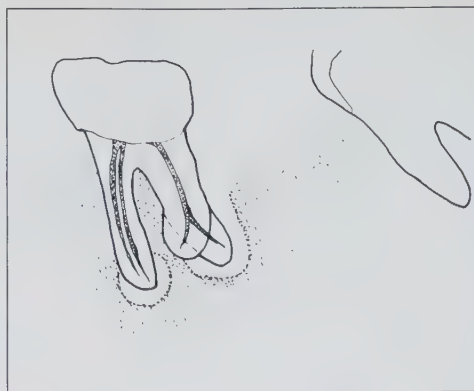


Fig. 2A Diagrammatic representation of a mandibular molar which exhibits pulpal necrosis which has affected the surrounding bone and which demonstrates crestal extension and a wide based distal pocket.



Fig. 3A Diagrammatic representation of a deep, angular periodontal defect.

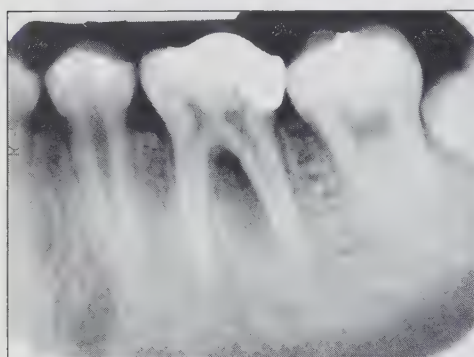


Fig. 1B Radiograph of case depicted in 1A which amplifies the effect of a necrotic pulp on the periodontium. Only endodontic treatment indicated. Reproduced by permission of the publisher from Gutmann, J.L., Prevalence, location, and potency of accessory canals in the furcation region of permanent molars. J Periodontal 49: 21-26, 1978.



Fig. 2B Radiograph of case depicted in 2A which demonstrates some of the common characteristics of this classification. Etiology presumed to be extensive restorative procedures.

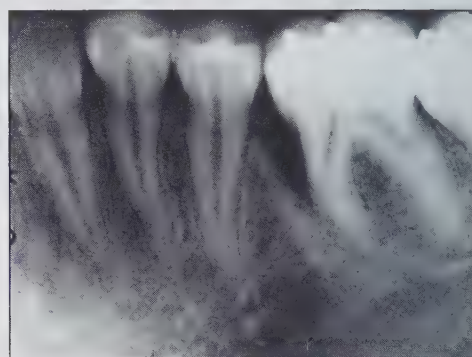


Fig. 3B Radiograph of case depicted in 3A which amplifies the singular isolated nature of an infrabony periodontal pocket on an adolescent patient. Pulp tissue presumed normal.

	Figure 1, 1B The primary pulpal lesion	Figure 2, 2B The primary pulpal lesion with secondary periodontal disease
CHARACTERISTICS	Sinus tract formation through the periodontium/ gingival sulcus Some degree of tooth mobility Varying levels of bone loss Furcation bone loss Narrow pocket formation Swelling in the attached gingiva Soreness to percussion/chewing Minimal to no discomfort Tooth exhibits a large/extensive restoration History of pulp capping/pulpotomy Evidence of improper/insufficient root canal treatment	Long standing pulpal disease Superimposition of plaque/calculus Evidence of generalized periodontal disease
DIAGNOSIS	Pulp testing/thermal/electric Evidence of localized periodontal disease Trace sinus tract Narrow, isolated pocket Minimal to no calculus Rapid onset Radiographic evidence of previous pulpal treatment	Evidence of pulpal inflammation/necrosis based on tests/exam Presence of significant periodontal inflammation/etiologies Radiographic presence of angular defects
TREATMENT AND PROGNOSIS	Root canal treatment With proper removal of etiology — excellent	Root canal treatment Periodontal treatment Dependent on ability to treat both disease entities

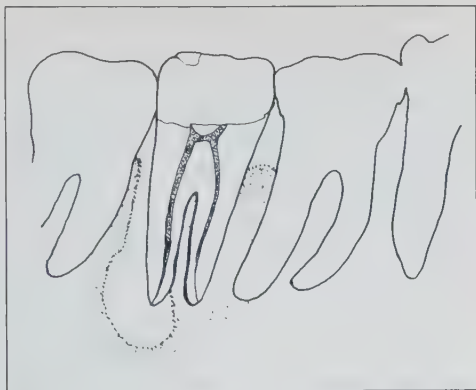


Fig. 4A Diagrammatic representation of an extensive and deep periodontal pocket which has extended to the depth of the root apex.

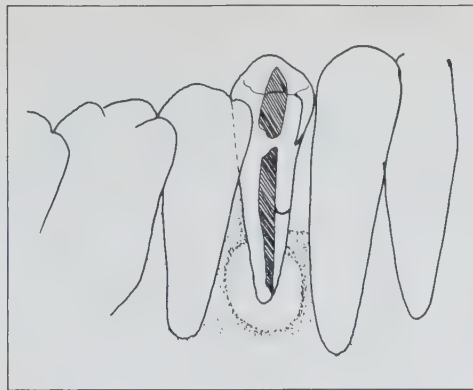


Fig. 5A Diagrammatic representation of the presence of periodontal bone loss, lateral canal at the depth of the pocket and pulpal necrosis.

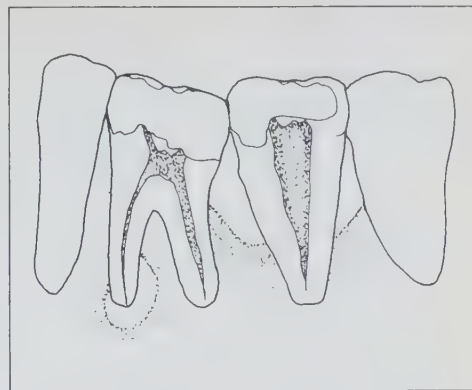


Fig. 6A "CONCOMITANT PULPAL-PERIODONTAL LESION" Diagrammatic representation of the independent presence of a periradicular lesion of pulpal origin disease and periodontal disease without an obvious mode of communication between the two.

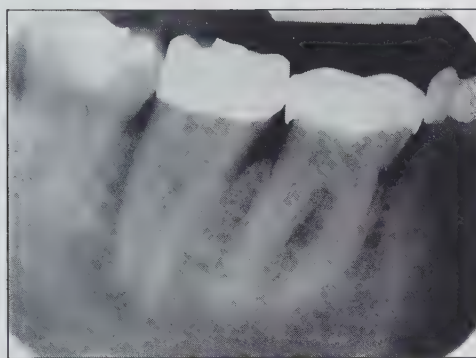


Fig. 4B Radiograph of case depicted in 4A. Patient experienced symptoms of acute periradicular periodontitis. Biopsy of the pulp from the distal root indicated, histologically, vital, healthy tissue.

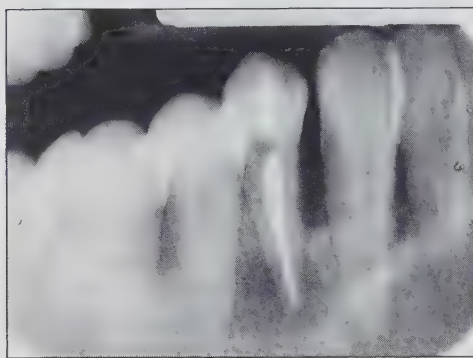


Fig. 5B Radiograph of case depicted in 5A which demonstrates the characteristics of a "combined pulpal-periodontal lesion."

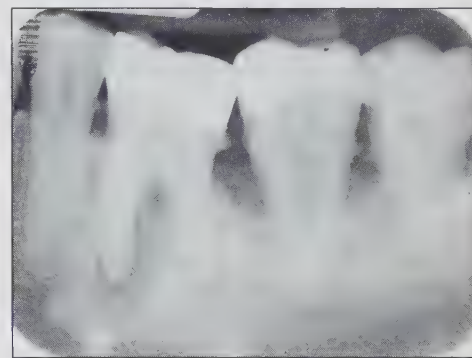


Fig. 6B "CONCOMITANT PULPAL-PERIODONTAL LESION" Radiograph of case depicted in 6A. The mandibular first and second molars exhibit periodontal disease in the surrounding periodontium. The first molar also demonstrates evidence of pulpal necrosis of non-periodontal origin.

Figure 3, 3B The primary periodontal lesion	Figure 4, 4B The primary periodontal lesion with secondary pulpal disease	Figure 5, 5B The combined "pulpal-periodontal" lesion
Teeth generally vital/viable Generalized bone loss Calculus/plaque Soft tissue inflammation/loss Broad-based pocket formation Possible occlusal trauma	Deep pockets History of extensive periodontal procedures Evidence of irreversible pulpal disease Evidence of pain accentuation Tooth may or may not be restored	Merging of a periradicular lesion of pulpal origin and progressive periodontal lesion (pocket) May mimic a lesion of pulpal origin only May be acute or chronic
Oral examination Probing Radiographic evidence of bone loss Pulp testing for differential diagnosis Evaluation of patient factors	History of disease progression Probing Pulp testing Radiographic changes Pain	Broad-based pocket formation which communicates with the periradicular lesion of pulpal origin in a narrow channel Pulp testing Radiographic evaluation/infrabony defect Evaluate for vertical root fracture
Based on extent of periodontal disease and treatment indicated Integrated with patient compliance factors May have to consider root or tooth resection/extraction	Dependent on periodontal treatment subsequent to endodontic treatment	Dependent on successful periodontal treatment subsequent to acceptable endodontic treatment Better if pulpal disease is the primary, overwhelming factor Better with short-term lesion

tory products and bacteria. Each has been addressed in the literature in isolated situations, but seldom if ever have they all been identified as potentially contributing to this dynamic interchange.²⁷

1. Dentinal tubules
2. Lingual grooves
3. Root/tooth fractures
4. Cemental agenesis/hypoplasia
5. Root anomalies
6. Intermediate bifurcation ridges
7. Fibrinous communications
8. Cervical enamel projections
9. Damage to the cementum/trauma — resorption

While the consensus of opinion supports the impact that a degenerating pulp can have on the periodontium, not all investigators are in agreement about the impact of periodontal disease on the pulp. In 1964 Mazur and Massler⁷ suggested there was no relationship between the severity of periodontal disease (as measured by the amounts of exposed root) and changes in the pulp. Teeth from the same patient with a wide variety of periodontal compromises demonstrated pulps to be histologically similar. Some pulps varied within the same patient from nearly normal to that of advanced degeneration, and it was felt that these changes were related more to the systemic condition of the patient than to chronological age or status of the periodontium.

Selter and Bender,²² in 1972, found no relationship between pulp disease and 1) depth of the periodontal pocket; 2) extent of bone loss; and 3) extent of periodontal disease. The greatest pulpal reactions that were observed in the presence of periodontal disease appeared to be related to excessive accessory communications.

Hattler and associates,²⁸ in 1977, using a rice rat model with induced periodontal disease, could not demonstrate any concomitant pulpal changes. However, no accessory communications were identified in the rat teeth.

Bergenholtz and Lindhe,²⁹ in 1978, placed ligatures around the necks of teeth in six adult Rhesus monkeys to induce inflammation and periodontal destruction. Subsequent plaque accumulation after five to seven months caused loss of 30% to 40% of the tissue supporting the roots. One group of teeth received no further treatment. Another group was subjected to scaling and root planing. After treatment, plaque was allowed to accumulate for two, ten, and thirty days on the freshly planed root surfaces. Histological examination showed in comparison to teeth with a normal periodontium, 57% of the teeth with a diseased peri-

odontium had pathologic pulp tissue alterations. These changes within the pulp were not of an extreme nature and only one tooth showed signs of total pulp necrosis. Aggravation or increased incidence of pathologic pulp reactions was essentially the same for the group of teeth with periodontitis alone and the group subjected to scaling and plaque accumulation. The study concluded that, in the monkey, (1) periodontal disease is limited to the cervical one-half of the root; and (2) plaque accumulation on exposed root surfaces did not cause severe changes in the pulp of the roots involved.

Czarnecki and Schilder,³⁰ in 1979, investigated the pulps of forty-six human teeth which evidenced varying degrees of periodontal disease. Pulpal changes in these teeth were within normal limits and severe caries and/or extensive coronal restorations were identified with pulpal changes regardless of the degree of periodontal involvement. Correlations could not be made between the presence or severity of periodontal disease and histological pulpal changes. Similar findings were reported by Torabinajad and Kiger.³¹

While most of the studies done prior to 1979 have assumed that periodontal disease directly affects the pulp, and the histological observations from studies may support that concept, conclusions cannot be drawn solely on the basis of such observations. Many studies make no mention of previous periodontal therapy or periodontally "normal" teeth which were not evaluated. The lack of inclusion of age-matched teeth and variations in the anatomical pathways of communication between these two tissues in different human and animal subjects also adds to the disparate findings.³²

Recent studies³²⁻³⁴ have focused more on the role played by an infected or degenerating pulp on the supporting periodontium. Hirsch et al.,³² and Clark and Hirsch,³³ have identified a strong association between pulpal pathosis and localized, severe angular alveolar defects which are commonly identified as primary lesions of periodontal origin caused by specific oral bacteria. It was felt that periodontal disease of pulpal origin has the potential to occur in the early stages of pulpal disease. An extension of this disease via the path of least resistance with a rapid breakthrough to the gingival sulcus, could account for the sudden and severe deepening of localized areas of periodontal pathosis. Influenced by additional communication from the compromised pulp, via alternative anatomical pathways, a further inflammatory reaction is encouraged in the periodontium

with increased granulation tissue formation and clastic activity. Colonization of these defects by organisms suited to exploit these pathological conditions accounts for the presence of the periodontopathogens and the antibodies directed against them.³³

Clinical parameters and classifications

Prior to 1960, the correct diagnosis of the interrelationship of pulpal and periodontal disease states was hampered by the absence of contributions to the dental literature which provided clinically relevant and biologically substantiated classifications for this relationship. While different classifications have been proposed,³⁵⁻³⁹ Simon and coauthors,⁴⁰ in their classic paper in 1972, presented the dental profession with a realistic and workable classification for pulpal-periodontal disease entities which was based on possible cause, diagnosis and prognosis.

The following listings highlight this classification, along with illustrations which demonstrate some of the common findings with each specific diagnostic state.

The essentials of this classification, as outlined by Simon and coworkers,⁴⁰ and supported by others^{13,41,42} have been of significant value to the practice of both endodontics and periodontics. However, there is an additional classification proposed which may be commonly seen and which may reflect the presence of two separate and distinct entities. This is referred to as the "CONCOMITANT PULPAL-PERIODONTAL LESION" (Fig. 6). In essence, both disease states exist, with different etiological factors and with no evidence that either disease state has influenced the other. This situation often goes undiagnosed and treatment is rendered to only one of the diseased tissues in hopes that the other will respond favorably.

In actuality, both disease processes must be treated concomitantly, with the prognosis dependent on the removal of the individual etiological factors and prevention of any further factors which may impact on the respective disease processes. For example, perforation of the floor of a pulp chamber during root canal treatment will have an adverse effect on the diseased periodontium, which heretofore may not have been influenced by the state of the pulp tissue.

All diagnostic states, based on succinct subjective and objective findings and limited-value pulp testing, are only probabilities relative to the true histopathological state of the tissues.^{32,33} However, if

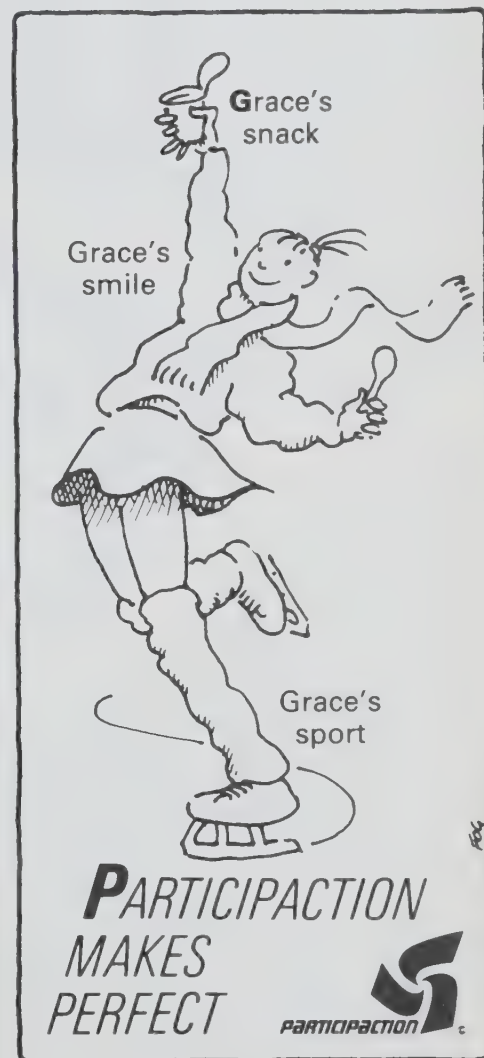
done thoroughly and based on a repair-predictive approach to treatment, most cases of interrelated pulpal and periodontal pathosis will respond to the treatment modalities presently available. Futuristic diagnostic testing is indicated to assist in a more accurate assessment of the histopathological status of the pulp and its complex interrelationship with the periodontium.

Summary

The close relationship between pulpal and periodontal disease states is reasonably established on clinical, radiographic and histological levels. While interpretations may vary on which came first — the proverbial “chicken or the egg” controversy — a thorough diagnosis and evaluation *must* ensue to determine the most probable etiology, course of disease and most reasonable treatment. In essence, when pulpal disease exists, the periodontium must be evaluated, and likewise, when periodontal disease is present, the clinical pulpal status must be ascertained. Should an interrelationship in disease entities exist, or if the potential for the existence is real or anticipated, appropriate treatment must be rendered to remove the true etiologic factors and enhance the prognosis for tooth retention. Δ

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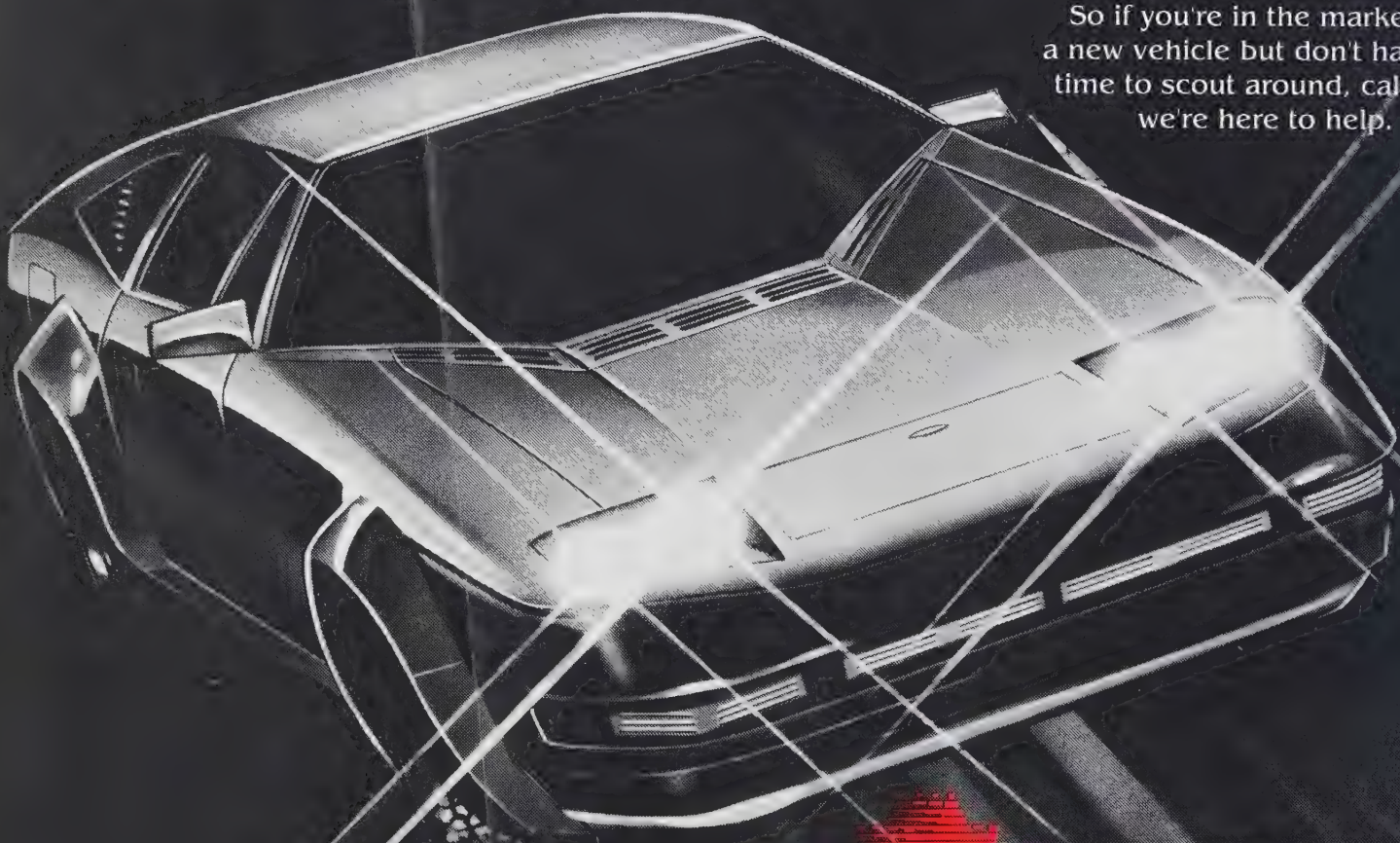
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New U.S. guidelines for prescribing dental radiographs — A critical review

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ABSTRACT

Most national dental organizations have approved recommendations which set out principles to guide the profession in its use of diagnostic radiation. In 1987, the Center for Device and Radiological Health (an agency of the United States government) published detailed guidelines. This significant initiative should encourage and accelerate the practical application of these principles. In this article, we identify and discuss what we determine to be a major flaw in the guidelines regarding radiography for children in the transitional dentition stage. As well, we have suggested revisions to the guidelines to eliminate some less serious flaws which we believe add unnecessary complexity to the chart.

SOMMAIRE

La plupart des organismes dentaires nationaux ont adopté des recommandations afin de guider les membres de la profession touchant l'utilisation des radiographies à des fins de diagnostic. En 1987, le Center for Device and Radiological Health, une agence du gouvernement américain, a publié des directives détaillées. Il s'agit d'une importante initiative qui devrait encourager et accélérer leur mise en vigueur.

Dans cet article, nous déterminons et nous commentons ce que nous appelons une grande lacune dans ces directives, à savoir les radiographies prises sur les enfants dont la denture est en état de transition. De plus, nous suggérons des modifications aux directives données afin de corriger des inexactitudes moins sérieuses qui, à notre avis, compliquent inutilement la façon de remplir les fiches d'examen.

Since the Americans exert a leadership role in most aspects of Dentistry, the new U.S. Guidelines for Prescribing Dental Radiographs (Fig. 1) will have an impact on our use of diagnostic radiation. Health and Welfare Canada, for its second edition of Oral Radiological Services,¹ is

considering holding a workshop to study current practices including these Guidelines. In addition, glossy charts of the Guidelines, produced by Kodak, have been distributed to Canadian dental schools and also are available to practitioners. We expect that the Canadian Dental Association will produce either a version of the guidelines or endorse the American initiative. For these reasons, we have critically examined the Guidelines and the literature used in their support. Our conclusions and suggested revisions are based upon these assessments.

In 1978, the United States Congress and the Department of Health Education and Welfare, co-sponsored a "National Conference on Referral Criteria for X-ray Examinations".² The purpose was to study the reasons for overuse of radiographs and the role of patient selection criteria in limiting radiographic exposure in the health sciences. As a result, the Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) established expert panels to develop patient selection criteria. The Dental Panel, composed of representatives from general dentistry, periodontics, pediatric dentistry, dental radiology, oral medicine and dental education, issued a Draft Dental Report in 1985.³ The final report⁴ of the Dental Panel was published in October, 1987, after extensive consultation with dental schools in North America (a few in Europe and Asia), the profession, and a review by the American Academy of Dental Radiology. The report contained "Guidelines for Prescribing Dental Radiographs" (Fig. 1). These guidelines have been incorporated in the latest version of the American Dental Association's "Recommendations in Radiographic Practices".⁵ To place these guidelines in perspective, a brief review of the background of dental radiographic practice is appropriate.

In the 1950's, dental students were taught the principle of complete or full mouth radiographic examination as a diagnostic aid.⁶ In addition to providing diagnostic information for symptomatic patients, these screening x-ray examina-

tions were conducted to detect abnormalities in those without signs or symptoms.⁶ In the same period, as a consequence of extensive research into the effects of low and repeated doses of radiation, the International Commission on Radiological Protection began to develop the risk/benefit concept. In its current form, this concept holds that all intentional exposure of a patient must be justified and that all prescribed exposures be kept as low as reasonably achievable.⁷ Every exposure must anticipate a positive net benefit to the patient in terms of treatment. Once this concept was accepted, screening radiography in medicine was practically eliminated. Studies have shown that routine survey by radiographs, except for dental caries, does not provide sufficient useful information to justify the practice.⁸

In the 1960's, the American Dental Association⁹ began publishing reports and recommendations to encourage dental radiography to conform to the concept of risk/benefit or justification as developed by the ICRP. These pertinent recommendations have been revised and updated several times since and were followed by publication of similar statements by other national dental associations including the Canadian Dental Association.¹⁰

The key recommendations in the current ADA version⁵ are:

1. "The nature and extent of diagnosis for required patient care constitute the only rational basis for determining the need, type and frequency of radiographic examination, not the concept of routine use of radiography as a part of periodic examinations of all patients."
2. "... as each patient is different from the next, so should radiographic examinations be individualized for each patient."

Over the past decade research has been conducted to identify selection or high yield criteria for dental radiography.¹¹ These are clinical signs or symptoms from physical examination or historical data that identify patients who are most likely to benefit from radiological examination. Prescription radiography, which applies selection criteria, is predicated on the

assumption that these would provide the necessary indications for the type and number of radiographs appropriate for each patient.

The "Guidelines for Prescribing Dental Radiographs" (Fig. 1) are specific and comprehensive. However, because this is a consensus drawn from many constituencies in the profession, it is our view that the inevitable compromises have resulted in a document which has departed in certain areas from the fundamental concept of justification.

Discussion of the Guidelines

In the development of the Guidelines, two concepts were emphasized by the Panel. They "strongly endorsed the concept that a history should be taken and a clinical examination of the patient should be completed prior to deciding whether dental radiographs should be made."¹² The second concept is embodied in the use of the phrase, "individualized radiographic examination." In their glossary, this phrase is defined as "a combination of periapical, bitewing, panoramic or other views selected for an individual patient on the basis of patient signs, symptoms and historical findings."¹³ These concepts are the essence of prescription radiography and seem to clearly suggest that the Guidelines were intended to move the profession away from the traditional protocol of routine, screening radiography.

Before assessing the Guidelines, we must point out a major inconsistency in the Panel's use of the term "individualized". This inconsistency could not be apparent to the reader unless the justification section, glossary and examples of application in the CDRH publication⁴ are studied for each guideline. After such scrutiny, it becomes apparent that where the term "individualized" is omitted from a guideline, the Panel is recommending screening radiography.¹⁴ What is much less clear is that when the term "individualized" is used, unless it is accompanied by the addition of the word "selected", it means screening radiography as well. For example, in the guidelines for the transitional dentition, the term "selected" is omitted but the term "individualized" is used. This masks the fact that screening radiography is recommended for these young patients.¹⁴ Subsequent publications for distribution to the profession^{15,16} have not included the justification section, glossary and examples which explain the Guidelines.

Radiographs for the Child Patient (Primary Dentition)

For the new child patient prior to

eruption of the first permanent tooth, posterior bitewings are recommended but only if the contacts are closed. This is screening radiography which is justified because of the prevalence of caries, the inaccuracies of clinical examination and the serious consequences if these lesions are not identified and treated. However, this recommendation gives the impression that other views are not required, which surely is not the intent. If selection criteria are present, then additional radiographs **may** be required for diagnosis. The phrase "individualized radiographic examination consisting of selected periapicals" as used in the guideline for the new adolescent and adult patient should also apply to the new and recall child patient.

For the purpose of prescribing radiographs for children at recall visits, two risk categories related to caries have been identified. For children with evidence of clinical caries or who have any of the high-risk criteria, the Panel recommends bitewings every six months until there is no evidence of clinical or radiographic caries. The guideline is common to children in both the primary and transitional dentition stages. The interval is traditional but arbitrary. The only supporting reference given in the justification for the guideline is to Silverstone¹⁷ who did not suggest such an interval.

The risk categories for caries and the recommendations seemed to us to be open to misinterpretation. If a child on recall has no clinical caries but has high-risk factors, bitewings are recommended every six months until there is no evidence of caries, even though there was no evidence of caries to begin with. If the first recall film showed no proximal lesions in spite of the continued presence of high-risk factors, is it assumed that the patient is assigned to the lower risk category, with bitewings taken at twelve-month intervals? This is unclear because the description for the low-risk category excludes patients with high-risk factors. Unless this recommendation is explicit, it is conceivable that a child without caries could have bitewings every six months until adulthood, simply because there were high-risk factors.

It is difficult to understand why the Panel identified a separate category for "Periodontal disease or a history of periodontal treatment" since periodontitis is extremely rare at this age.¹⁸ In our view, if the general guideline for adolescents and adults is applied to the child patient, as it should be, a separate category is redundant.

For "Growth and development assess-

ment", which also requires justification as a separate recall category, the use of the phrase "usually not indicated" is inappropriate. If there are signs, symptoms or pertinent history, radiographs appropriate to a diagnosis are indicated.

Radiographs for the Child Patient (Transitional Dentition)

For the new child patient in the transitional dentition stage, the Panel recommends an individualized radiographic examination consisting of periapical/occlusal views and posterior bitewings. As an alternative, the dentist may use a panoramic examination and posterior bitewings. With the omission of posterior bitewings, this guideline for the new patient is identical to that for the recall patient in this age group under the "Growth and development assessment" category. For each of these guidelines, the term "individualized" is used but the term "selected" does not appear. This omission is critical. By the Panel's definition of the term individualized, this should mean radiographs selected for an individual patient on the "basis of patient signs, symptoms and historical findings".¹³ In spite of this definition, there is the unequivocal statement in the justification section for these guidelines, that "children who present on recall following the eruption of the first permanent tooth *should* have a radiographic examination to assess growth and development" and further, "this radiographic examination . . . *should* be conducted at the first recall visit . . . and need not be repeated unless dictated by clinical signs and symptoms".¹⁴ Although in the recommendation the term "individualized" is used, this is screening radiography. Our opinion that these guidelines give the illusion of the application of selective radiography is supported by Case 3 in the section entitled, "Examples of Chart Use."¹⁹ In this example, a seven-year-old child presents for a six-month recall. Since the last recall, a permanent mandibular incisor has erupted and with the exception of three new carious lesions, *no signs or symptoms* are noted. The recommendation would be to obtain periapical films of all posterior quadrants, occlusal films of the maxillary and mandibular anterior regions, and a new set of bitewing radiographs.¹⁹ This is an eight-film survey which for many years has been recommended by the specialty of pediatric dentistry.^{20,21} Although the guidelines appear to apply the concept of criteria-based radiography, this is contradicted by both the justification and the case example.

The protocol of a minimum eight-film survey is usually supported by data from a 1968 clinical study by MacRae et al.,²² who determined that a frequently used three-film survey (two posterior bite-wings and a maxillary anterior periapical) failed to reveal nine congenitally-missing bicuspid and two supernumerary mandibular bicuspid in 456 children aged 6-9 years. The authors showed that the additional periapicals of the eight-film survey disclosed these anomalies. The question of the urgency to acquire the information at this age and its relevance for treatment in such young children was not addressed. The authors dismissed a suggestion put forward by Brown in 1952,²³ that if a posterior bitewing fails to reveal the presence of any developing bicuspid, a supplementary periapical would provide the necessary information. Brown's suggestion was remarkably consistent with the current philosophy of prescription radiography. The reason given for dismissal was that since one out of three patients may require additional radiographs, the "inconvenience of obtaining additional views would have to be weighed against the **slight extra time and expense involved** in taking the eight-film survey. . ."²² The concern for unnecessary radiation exposure was not a determining factor in the 1960's. Such reasoning reflected the philosophy of the period but is not consistent with current concepts.

The justification for routine radiography for this age group is the presence in the population of one developmental dental anomaly in every 15 children.²⁰ This proportion is usually supported by reference to a study published in 1966, in which Castaldi et al.²⁴ reported that in 457 children, age 6-9 years, 4.1% had missing teeth, 3.1% supernumeraries and

0.2% had fused teeth. No other anomalies were reported. Slightly more than 70% of the missing teeth were second bicuspid, mostly lowers. The majority of the remaining missing teeth were upper laterals. Of the 16 supernumeraries, 14 were located in the upper incisor region and two in the lower bicuspid. Essentially then, the developmental anomalies of consequence are missing second bicuspid and supernumerary upper incisors. The prevalence of these anomalies was 7.2%. Other studies have confirmed these data.^{25,26}

What are the consequences of not discovering such anomalies by radiography at this age? In an extensive review of the literature, Lervik and Cowley²⁷ noted that 40-74% of children with an upper incisor supernumerary exhibited altered eruption of the permanent incisor. In other words, in a significant percentage of patients there is clinical evidence which would indicate a need for radiographs and treatment. Supernumerary teeth rarely cause problems other than altered eruption and opinion is widely divided on when, if ever, in the absence of eruption interference, surgical intervention is indicated.²⁷ For the most commonly disclosed anomaly, the missing lower second premolar, there is disagreement on whether to treat these children during the transitional dentition or to wait until all the permanent teeth have erupted.²⁷ The justification for a radiographic search for these anomalies under the guise of assessing growth and development is not persuasive. Lervik and Cowley could not find justification for the practice of screening radiography for developmental anomalies; nor can we.

Radiographs for the Adolescent and Adult Patient

For these new patients, the Panel rec-

ommends "Individualized radiographic examination consisting of posterior bite-wings and selected periapicals" or, a full mouth intraoral radiographic examination if there is evidence of generalized dental disease. For this category of patient, the Panel has applied, without reservation, the concept of selective or prescription radiography in combination with justifiable screening radiography for caries and has used the term "individualized" as they defined it. However, the sentence on the full mouth radiographic examination is unnecessary. We believe the term "full mouth" is an anachronism and should be retired. The weakness of the term lies in its implication of a commitment to a survey composed of a fixed number of periapical radiographs. If the signs and symptoms are those of generalized disease, the radiographic examination should consist of enough films of *whatever type necessary* to examine the teeth and jaws.

The interval for screening bitewings for recall patients is appropriate, given our inability to predict the rate of progression of caries for an individual patient. However, for the high-risk adult, the qualifying phrase "or until no carious lesions are evident" as used for the child and adolescent, must be included. This will encourage the dentist to extend the interval to one appropriate to the risk category.

It is our view that selective radiography is appropriate for both new and recall patients with periodontitis or a history of periodontitis. At the 1982 Technology Assessment Forum on Dental Radiology,²⁸ the workshop assessing the role of radiographs in the diagnosis of periodontal disease concluded that as most periodontal diseases can be recognized by clinical examination without radiographs, "the most effective use of radiographs in periodontics is as an adjunct following clinical

TABLE I
Suggested Revision of Guidelines for Prescribing Dental Radiographs

CHILD		ADOLESCENT/ADULT
Primary or transitional dentition		
I ALL EXAMINATIONS — except for caries	Individualized* examination consisting of selected radiographs. These may include any or all of the following: periapical, occlusal, panoramic or other extraoral radiographs	
II CARIES EXAMINATION		
A New Patient	Screening bitewing radiographs — two or four films as determined by the anatomy, number and alignment of teeth	
B Recall Patient	Screening bitewing radiography at 6-12 month intervals until no radiographic or clinical evidence of caries. Patient then assigned to category (ii)	Screening bitewing radiographs at 12-24 month intervals until no radiographic or clinical evidence of caries. Patient then assigned to category (ii)
(i) Caries and/or high-risk factors for caries	12-24 month intervals	24-36 month intervals
(ii) No caries		
III NEW EDENTULOUS PATIENTS	Screening radiographs — periapicals or panoramic radiograph	
* Individualized: defines the concept that indications for radiographs are determined by the patient's history, signs and symptoms. If radiographs are indicated, the number and type should be appropriate to the diagnostic and treatment needs.		

Guidelines for Prescribing Dental Radiographs

(Fig. 1. Guidelines as published by the Centre for Devices and Radiological Health (FDA, Washington, D.C., October, 1987).

Patient Category

Child

Primary Dentition
(prior to eruption of first
permanent tooth)

Transitional Dentition
(following eruption of first
permanent tooth)

NEW PATIENT*

All New Patients to Assess
Dental Diseases and Growth and
Development

Posterior bitewing examination if
proximal surfaces of primary
teeth cannot be visualized or
probed

Individualized radiographic
examination consisting of
periapical/occlusal views &
posterior bitewings or panoramic
examination & posterior bitewings

RECALL PATIENT*

Clinical caries or high-risk
factors for caries**

Posterior bitewing examination at 6-month intervals or until no carious
lesions are evident

No clinical caries and no high-risk
factors for caries**

Posterior bitewing examination at
12-24 month intervals if proximal
surfaces of primary teeth cannot
be visualized or probed

Posterior bitewing examination at
12-24 month intervals

Periodontal disease or a history
of periodontal treatment

Individualized radiographic examination consisting of selected
periapical and/or bitewing radiographs for areas where periodontal
disease (other than nonspecific gingivitis) can be demonstrated
clinically

Growth and development
assessment

Usually not indicated

Individualized radiographic
examination consisting of a
periapical/occlusal or panoramic
examination

*Clinical situations for which
radiographs may be indicated
include:

A. Positive Historical Findings

1. Previous periodontal or endodontic therapy
2. History of pain or trauma
3. Familial history of dental anomalies
4. Postoperative evaluation of healing
5. Presence of implants

B. Positive Clinical Signs/Symptoms

1. Clinical evidence of periodontal disease
2. Large or deep restorations
3. Deep carious lesions
4. Malposed or clinically impacted teeth
5. Swelling
6. Evidence of facial trauma
7. Mobility of teeth
8. Fistula or sinus tract infection
9. Clinically suspected sinus pathology
10. Growth abnormalities
11. Oral involvement in known or suspected systemic disease
12. Positive neurologic findings in the head and neck
13. Evidence of foreign objects
14. Pain and/or dysfunction of the temporomandibular joint
15. Facial asymmetry

The recommendations in this chart are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient's health history and completing a clinical examination. The recommendations do not need to be altered because of pregnancy.

Adolescent		
Permanent Dentition (prior to eruption of third molars)	Dentulous	Edentulous
Individualized radiographic examination consisting of posterior bite-wings & selected periapicals. A full mouth intraoral radiographic examination is appropriate when the patient presents with clinical evidence of generalized dental disease or a history of extensive dental treatment.		Full mouth intraoral radiographic examination or panoramic examination
Posterior bitewing examination at 6-12 month intervals or until no carious lesions are evident	Posterior bitewing examination at 12-18 month intervals	Not applicable
Posterior bitewing examination at 18-36 month intervals	Posterior bitewing examination at 24-36 month intervals	Not applicable
Individualized radiographic examination consisting of selected periapical and/or bitewing radiographs for areas where periodontal disease (other than nonspecific gingivitis) can be demonstrated clinically		Not applicable
Periapical or panoramic examination to assess developing third molars	Usually not indicated	Usually not indicated
16. Abutment teeth for fixed or removable partial prosthesis 17. Unexplained bleeding 18. Unexplained sensitivity of teeth 19. Unusual eruption, spacing or migration of teeth 20. Unusual tooth morphology, calcification or color 21. Missing teeth with unknown reason	**Patients at high risk for caries may demonstrate any of the following: 1. High level of caries experience 2. History of recurrent caries 3. Existing restoration of poor quality 4. Poor oral hygiene 5. Inadequate fluoride exposure 6. Prolonged nursing (bottle or breast)	7. Diet with high sucrose frequency 8. Poor family dental health 9. Developmental enamel defects 10. Developmental disability 11. Xerostomia 12. Genetic abnormality of tooth 13. Many multisurface restorations 14. Chemo/radiation therapy

examination. . .²⁸ Since current periodontal practice embraces the philosophy of screening radiography by means of full mouth radiographs,²⁹ the Panel's guideline represents significant progress, especially if references to full mouth radiographs for new patients is omitted.

The recommendations for screening radiographs for third molars in adolescent recall patients do not have, in our view, a sound scientific basis. The acquisition of information on the presence, position and development of third molars in asymptomatic adolescents has little immediate value in treatment planning.^{30,31} However, when there are signs and/or symptoms of abnormalities associated with eruption of one or more third molars, then appropriate radiographs should be prescribed.

Edentulous patients

The literature used in support of screening radiography for new edentulous patients is only marginally persuasive^{32,33} but until there are studies to identify selection criteria, no reasonable alternative seems acceptable. For the present, we believe that clinical judgement and experience can prevent overuse.

Suggested revision of guidelines

Revisions are suggested which we believe will better reflect the principles of criteria-based radiography (Table I). Where time-based schedules are recommended, these are indicated clearly as screening radiography and not disguised by the term "individualized". The original format of the CDRH Guidelines is maintained but the recall patient categories of periodontal disease and growth and development assessment have been eliminated.

Underlying the use of guidelines, there is a fundamental principle that clinical judgement and experience will be the ultimate determinants of the need for radiographic examination. Guidelines can never cover every clinical situation or variant, nor were they intended to do so. They do form a matrix for application of the risk/benefit concept which must replace the unjustified protocol of survey radiography. We believe that where an interval range is stated, professional judgement should extend or decrease the interval beyond the stated recommendation where appropriate.

Comment

The Guidelines for Prescribing Dental Radiographs are a major initiative which will have an impact on the teaching and

practice of oral radiography in this country. In most respects, they should be welcomed as a positive step toward the elimination of unnecessary radiation. We have discussed in detail the guidelines for the child patient at the transitional dentition stage and, for the reasons given, have determined that they are flawed. The Panel recommended screening radiography for the age group at greatest risk while at the same presenting the illusion of an "individualized" examination. In our view, there are minor flaws in a recommendation of routine radiographs for third molar evaluation in adolescents and the establishment of separate guidelines for "Periodontal disease" and "Growth and development assessment". These add unnecessary complexity to the chart without serving a fundamental need.

Rather than simply adopting these Guidelines, we urge a critical examination by the Canadian Dental Association, the Canadian Academy of Oral Radiology and the appropriate government regulatory agencies, so that guidelines for Canadian use will be simpler and free from unjustified screening radiography. Δ

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The dental health of 12-year-old children in Dominica: A report of a survey using WHO methods

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ABSTRACT

As part of the process of assisting in the planning of a primary dental health care system in the Commonwealth of Dominica, we conducted a survey of mostly 12-year-old children. The purpose of the survey was to assess the oral health status and identify the needs for treatment and prevention. Secondary purposes included training Dominican dental auxiliaries and assistants to collect epidemiologic data and to use the findings to compare oral health status by region and previous coverage by the auxiliaries.

The sample was obtained from schools throughout the country. Examinations were conducted according to standard WHO methods, using mirrors and explorers. The findings were recorded on prepared forms and the data were processed in Toronto using microcomputers. We found 31 % of children to be caries-free and the mean DMFT score to be 2.5 (95 % CI 2.2-2.7). Only 8 % of lesions had been treated. No differences were observed by region but in areas covered by dental auxiliaries, children had fewer decayed teeth, fewer DMFT and higher F/DMFT ratios. Only 17 % scored 0 on the CPITN index and 63 % scored 2, meaning they had calculus. Debris was 3.6 times more likely to be found among those with gingival bleeding or calculus compared to those with periodontal health. Single surface restorations made up 82 % of the estimated 2.0 caries treatment services required.

The survey findings will allow planners to design specific preventive and treatment programs to meet Dominica's needs.

SOMMAIRE

Dans le cadre de la planification d'un régime de soins dentaires primaires en République de Dominique, nous avons effectué un sondage auprès d'enfants âgés pour la plupart de 12 ans afin de déterminer leur état de santé dentaire et leurs besoins en soins de restauration et

de prévention. De plus, nous avons voulu former des assistants et des auxiliaires dentaires dominicains pour qu'ils puissent recueillir des données épidémiologiques et en utiliser les résultats pour comparer l'état de santé dentaire des enfants par région et les soins donnés antérieurement par les auxiliaires.

Nous avons choisi les enfants dans différentes écoles du pays. Nous les avons examinés conformément aux méthodes ordinaires de l'OMS, à l'aide de miroirs et de sondes. Nous avons inscrit les résultats sur des formulaires et les données ont été traitées par micro-ordinateur à Toronto. Nous avons découvert que 31 % des enfants n'avaient pas de caries et que la moyenne des dents CAO étaient de 2,5 (95 % RC 2,2-2,7). Seulement 8 % des lésions avaient fait l'objet de traitements. Nous n'avons pas relevé de différences entre les régions, mais dans celles où des auxiliaires dentaires avaient offert leurs services, les enfants avaient moins de caries, le facteur CAO étant plus bas et le ratio O/CAO plus élevé. Suivant l'Indice ICPBT, seulement 17 % ont obtenu 0 et 63 % ont obtenu 2, ce qui signifie qu'ils avaient des dépôts tartreux. Nous avons découvert 3,6 fois plus de débris chez ceux qui avaient des gencives saignantes et des dépôts tartreux que chez ceux qui avaient un parodontite sain. Les restaurations sur une seule surface comptaient pour 82 % des services exigés pour le traitement de 2,0 caries.

Les résultats de ce sondage vont permettre aux planificateurs d'élaborer des programmes de prévention et de soins adaptés aux besoins de la République de Dominique.

Background

Dominica is an island in the Lesser Antilles located between the French islands of Guadeloupe and Martinique. The 80,000 residents are located mainly along the coast, and the mountainous interior supports lush growth and

the cultivation of bananas and citrus fruits. Tourism, although common among neighbouring islands, is a very small part of the economy.

The Dominican Ministry of Health is committed to implementing a national health program based on the primary health care model.¹ Primary Health Care (PHC) is a model that recognizes the interdependence of health, social and economic systems and stresses both community involvement in planning health services and the use of affordable technology. In Dominica, community health nurses and environmental workers are based in local health clinics. They are supported by a physician, nurse practitioners and other staff working from larger health centres in each of seven districts. Secondary and tertiary care services are located in the capital city of Roseau.

Community-wide preventive dental services are planned to be delivered at the local clinic level and clinical prevention and primary care are to be provided by staff working out of the district health centres. In 1989, there were four dentists practising on the island. Two full-time and one part-time dentist provided primarily surgical services to adults under contract to the Ministry of Health throughout the island. In addition, four dental auxiliaries were employed full-time to provide preventive, restorative and surgical services to children.

In 1988, the Ministry of Health, with support from the Pan American Health Organization, enrolled two students at the National School of Dental Therapy (NSDT) at Prince Albert, Saskatchewan. This school trains dental therapists to provide primary dental care services to Canada's native people. Portable equipment, designed and built at the school, allows therapists to serve more than one community and provide care in a variety of settings. NSDT staff also distribute supplies to and review the quality of care of graduate therapists in the field, even though several different agencies employ them.

In 1988, the Dominican government also asked the University of Toronto (under whose auspices the NSDT operates) to draft a plan to provide continuing education to the existing four auxiliaries and plan to organize the dental services consistent with its PHC strategy. Accordingly, a planning mission from the University of Toronto, visited Dominica in February 1989. Dr. James L. Leake and Dr. Keith W. Davey from the Faculty of Dentistry along with Dr. William R. Bedford, Senior Dental Consultant, Department of National Health and Welfare, made up the planning group. The first priority of the visit was to conduct a survey of the oral health status of a representative group of children. This article reports on this survey.

Purpose

The purpose of the survey was to document the types, prevalence and severity of dental disease and to thereby estimate the preventive and treatment needs of Dominican children. A secondary purpose was to discover whether urban or rural living and previous dental auxiliary program coverage affected the dental health of children. A third purpose was to begin to train local dental personnel to conduct their own surveys so they could assess Dominica's needs and evaluate the impact of future program changes.

Method

Personal schedules and funds limited our time on the island to about two weeks. During this period, we also had to obtain information on the philosophy, organization and resources available within the Primary Health Care strategy for dental care and discuss with Ministry officials options for the dental care system. We therefore chose to examine only 12 year-olds and to train the four auxiliaries to survey those we could not complete during the two-week visit.

The secondary purpose, to detect the

effect of service coverage and urban/rural residence, required we obtain a larger total sample than we would have otherwise had to.

Sample derivation

At age 12, school attendance is compulsory in Dominica. We obtained a list of all schools and allocated them into six groups: three geographic areas and whether or not the school had been recently served by a dental therapist. We estimated the population of 12-year-olds to be 10% of the school enrolment. Schools with fewer than 12 eligible children were eliminated from the sampling frame. We blindly drew schools until we estimated we had equal clusters of about 80 eligible children for each of the six groups. Within one selected large urban private girls' school, a systematic sample was taken in order to obtain an equivalent number as that available from the allied but smaller private boys' school. In all other schools, all available 12-year-olds were examined. In some small rural schools, additional 11- and 13-year-olds were examined to increase the sample size and make the trip to the school worthwhile. In most schools, the number of 12-year-olds was much less than the 10% we had estimated.

The children were examined by the three visitors and the four auxiliaries, using explorers, mirrors and natural light. The number of examiners for each survey design-group ranged from 3 to 6. Time did not permit re-examination to establish intra- or inter-examiner reliability. However, the senior author, who is experienced in survey work, trained all examiners according to strict WHO-based² criteria and did review results of the first few examinations with the other examiners.

Data analysis

The survey forms were returned to Toronto and the analysis was conducted

on microcomputers at the Department of Community Dentistry. Data were entered using EpiInfo³ and analyzed using SPSS PC+.⁴ National prevalence scores were calculated using data weighted to reflect the six sampling groups' relative contribution to the estimated Dominican population of 12-year-olds. Statistical testing of differences in means was conducted with unweighted data following the methods outlined by Kleinbaum and Kupper,⁵ including ANOVA with two factor patterns for either equal or unequal cell numbers, as appropriate.

In checking the results, it was apparent that one examiner of 41 children consistently under-reported caries when compared to other examiners in the same sampling groups. These scores were adjusted using a random number function with a mean and standard deviation calculated from the pooled average of the other examiners. Using the adjusted caries (mean DMFT) scores, no differences were found between examiners when controlling for the six groups ($p = 0.09$ ANOVA).

Results

Table I shows the distribution of the sample by group designation. The estimated total is the 10% of the population of children in all schools in each group. Age 12 enrollment figures for the selected schools were 625 children, but when we arrived only 413 were on the rolls. With absentees and non-participation, only 332 12-year-olds were examined, and therefore these were supplemented by 60 11-year-olds and 49 13-year-olds (plus one whose age was not recorded), resulting in 442 completed examinations. Weighting our sample of 442 to produce an accurate national sample, produced a group of 446 cases.

Overall, 137 or 31% of the children had no carious lesion detectable on examination. Table II provides the mean caries scores (DMFT — decayed, missing and

TABLE I

Dental health survey of 12-year-old Dominican children sampling scheme

Group	Geographic	Served by Auxiliary	Number of Children				
			Estimated Total	Sample Estimated	Observed	Examined 12 Year-olds	Total
1	Urban	Yes	409	209	115	92	101
2	Urban	No	85	85	52	43	71
3	Urban/rural	Yes	276	97	68	55	69
4	Urban/rural	No	97	84	61	46	59
5	Rural	Yes	426	78	61	50	79
6	Rural	No	250	72	56	46	63
Total			1543	625	413	332	442

TABLE II

Mean number of decayed, missing and filled teeth among 12-year-old Dominican children by region and coverage

	Region			Auxiliary Coverage		National (SEM)	
	Rural	Mixed	Urban	Yes	No		
n	142	128	172	249	193	446	
Decayed	2.0	2.5	2.2	1.9	2.6*	2.1	(.11)
Missing	0.2	0.3	0.2	0.2	0.3	0.2	(.03)
Filled	0.2	0.1	0.1	0.2	0.1	0.2	(.03)
DMFT†	2.4	3.0	2.6	2.3	3.0*	2.5	(.12)
F/DMFT	0.10	0.06	0.04	0.1	0.02**	0.08	(.01)

* ANOVA $p < 0.01$ ** ANOVA $p < 0.001$

† May not add due to rounding

filled teeth) by the two factors of interest, geography and coverage, and for the whole country. The F/DMFT ratio is an indicator of the effect of clinical treatment services showing the proportion of carious teeth successfully restored. The national DMFT score was estimated as 2.5 (95% CI 2.2-2.7). Few lesions (8%) were restored and a mean of 0.2 teeth had been extracted. Thus, the majority of disease (mean = 2.1 teeth) was untreated.

No differences were seen by geographic region but areas covered by the auxiliaries had healthier values for decayed teeth, DMFT, and the F/DMFT ratio.

Table III shows the distribution of the mean DMFT scores and F/DMFT ratio according to the two factors combined. The ANOVA test showed that the two-way interaction of region and coverage was not significant, neither was geographic region, leaving the coverage as the only significant effect. The DMFT score for caries is highest (3.34) in the urban area currently without coverage, and lowest in the urban covered areas. The proportion of successful treatment was highest, 0.17, in the rural covered areas and only 0.01 in the rural, not-covered areas.

We found 61% of children needed one or more caries treatment services, including 12% who needed one or more extractions and 14% who needed care urgently. Table IV shows the overall estimate of caries treatment requirements. Single surface restorations were the most common need, making up 82% of the services required to treat caries. The weighted national mean shows 2.0 (95% CI 1.8-2.2) services were required. Other than for two surface restorations, the mean treatment requirements did not differ significantly between geographical groups.

We also found a high prevalence of periodontal conditions. Using the weighted

national sample, only 17% were free of signs, 21% showed bleeding on gentle probing (CPITN = 1) and 63% had calculus with or without bleeding (CPITN = 2). Regionally, the prevalence of calculus appeared to increase from 55% of children in rural areas, to 66% in mixed areas, to 72% in urban areas.

Table V shows the percentage of children who had debris on one or both index teeth (tooth 21 or 41) among those with CPITN scores of 1 or 2 and CPITN scores of 0 (periodontal health) for each region. Fifty-six per cent of the 440 (unweighted sample) with complete data, had debris. Debris was more prevalent among those with CPITN = 1 or 2 (62%) and in rural children (60%). Mantel-Haenszel analysis showed that, among those with CPITN scores of 1 or 2, the relative odds of finding debris was 3.6 when controlling for the region.

To meet the periodontal needs of the

children, the examiners recommended that 32% needed prophylaxes, 58% needed scaling and 64% needed oral hygiene instruction.

Discussion

Four Dominican dental auxiliaries and three Canadian dentists conducted epidemiological examinations according to WHO criteria on 442, 12-year-old children in Dominica. This was the first study of the oral health of Dominican children using standardized WHO methods. Key informants had estimated the prevalence of caries to be in the order of 70%-90%. The survey placed the actual prevalence at 69%, the bottom of the estimated range. Further, the current intensity of the caries disease, as shown by the mean DMFT index score of 2.5, is considerably better than 3.0, the WHO/FDI global goal for the oral health of 12-year-olds in the year 2000.⁶ By way of comparison, Canada's provincial mean DMFT scores for 13-year-olds currently range from 2.1 to 5.6, resulting in a weighted national mean of 3.6 DMFT.⁷ While the trend in Canada and many other countries is to

TABLE III

Mean DMFT and F/DMFT scores by region and auxiliary coverage

Mean DMFT	Rural	Mixed	Urban
Covered	2.25	2.84	2.06
Not covered	2.56	3.17	3.34
F/DMFT			
Covered	0.17	0.07	0.07
Not covered	0.01	0.05	0.02

TABLE IV

Caries treatment services needed by 12-year-old Dominican children

Service Type	Services per Child				Total Caries Services†
	Rural	Mixed	Urban	National**	
Restorations					
One surface	1.5	1.9	1.7	1.6	82.4%
Two surface	0.1	0.3	0.3*	0.2	9.0%
Three surface	0.00	0.03	0.03	0.02	0.8%
≥ Four surface	0.01	0.01	0.02	0.01	0.0%
Extractions	0.1	0.24	0.17	0.1	7.2%
Total†	1.8	2.6	2.3	2.0	100%
Number of Children	142	128	172	446	
Services					889

* ANOVA $p < 0.01$

** May not add due to rounding.

† Weighted national estimate.

lower DMFT scores,^{8,9} our findings do not permit any comment, either on trends over time or differences between older and younger cohorts in Dominica.

Other results of the survey show that the DMFT and F/DMFT scores are consistently better in areas which had been served by the existing four dental auxiliaries. While these differences are statistically detectable and, for the F/DMFT ratio, clinically important, there remains much room for improvement since, even in the best area, only 17% of caries were successfully filled.

Most caries occurred on pits and fissures and, as a result, over 82% of the caries treatment requirements were one-surface restorations. This finding points to the opportunity to prevent much disease through an aggressive program to prevent pit and fissure caries. Nationally, we estimate 2.0 caries treatment services are required per child, with no clinically important differences by region.

Calculus was a very prominent finding among the children. Overall, 62% of children had calculus, which increased in prevalence from rural to urban areas. Debris appeared to be an important factor associated with bleeding and calculus, being 3.6 times more likely to be found among children with a CPITN score greater than 0. There is a high level of periodontal treatment needs among the children and an obvious need to improve oral hygiene practices.

The finding that 14% of children needed urgent care for pain or infection present, or likely within the next month, supports the priority the government is attaching to the development of the dental services. Δ

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TABLE V

Per cent of children with debris by CPITN scores and region

	CPITN = 1 or 2		CPITN = 0		All	
	%	(n)	%	(n)	%	(n)
Rural	65	(116)	38	(26)	60	(142)
Mixed	64	(104)	30	(23)	58	(127)
Urban	57	(143)	25	(28)	52	(171)
All	62	(363)	31	(77)	56	(440)

Mantel Haenszel Test OR 3.6 (95% CI 2.1 - 6.1)
% = per cent of children in cell with debris; n = number of children in cell.

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Chairside repair of ceramo-metallic restorations

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ABSTRACT

The ceramo-metallic crown has enjoyed increasing universal popularity as the full-coverage restoration of choice where long-term esthetics is desirable.

The porcelain veneer is colour stable and relatively wear resistant. It has excellent compressive strength but poor tensile and shear strength, which unfortunately can result in fracture. Consequently, there is a need for chairside repair, since remake is often contraindicated. Commercially available repair systems are inconsistent and unpredictable and provide, at best, only temporary results despite recent improvements in materials and technique. Two new adhesive composite resins appear promising, although long-term clinical studies are not available.

This article deals first with prevention and a review of the literature. Secondly, clinically proven methods of providing mechanical retention for resin and composite resin repairs of fractured porcelain are presented. The combination of mechanical retention and recently developed adhesive composite resins should provide the dentist with a reliable chairside repair system that could last for many years.

SOMMAIRE

Pour une restauration esthétique durable, les couronnes céramo-métalliques ont de plus en plus le suffrage universel.

La couleur des couronnes mixtes est stable et leur résistance à l'usure est relativement bonne. Leur force de compression est excellente, mais non leur force de trituration, ce qui malheureusement peut entraîner des fractures. Aussi faut-il alors les réparer, étant donné qu'il est souvent contre-indiqué de les remplacer. Les produits offerts sur le marché pour réparer les couronnes mixtes sont de qualité inégale et leurs résultats sont souvent imprévisibles. Au mieux, et bien que les matériaux et les techniques aient été récemment améliorés, les résultats seront seulement temporaires. Cependant, deux nouveaux adhésifs à base de résine composite semblent prometteurs, mais on ne possède pas encore de données à leur sujet tou-

chant les résultats à long terme.

Dans cet article, il est d'abord question de prévention et des ouvrages disponibles sur le sujet. On explique ensuite les méthodes cliniquement éprouvées pour assurer la rétention mécanique des couronnes facturées réparées à l'aide de résines et de résines composites. En combinant la rétention mécanique avec les nouveaux adhésifs à base de résine composite, le dentiste devrait pouvoir réparer des couronnes de manière à ce qu'elles durent de nombreuses années.

Prevention

Most fractures can be prevented by proper design, good technique and favourable occlusion. Some possible causes of porcelain fracture related to design and technique are:

1. A sub-structure casting that is too thin on the labial and/or the incisal.
2. A minute perforation in the sub-structure casting.
3. A porcelain veneer that is unsupported by metal, i.e., a veneer that is too long at the incisal edge.
4. Lack of parallelism in single and/or multiple preparations or overly retentive designs.
5. Deformation of metal adjacent to precision attachments.
6. Excessive firing shrinkage of porcelain as a result of too rapid cooling or metal ceramic mismatch.
7. Faulty occlusion which results in load concentration.

These problems can be averted in most instances by adequate tooth reduction which enables construction of a bulky sub-structure with a stress-free design, a precise but passive fit, choice of compatible ceramo-metallic materials, meticulous laboratory technique in the application of porcelain, impeccable chairside try-in and cementation procedures, as well as careful finalization of occlusion.

A significant number of fractures also result from masticatory accidents and external trauma.

Review of literature

In 1960, silane coupling agents were introduced commercially in glass-

reinforced plastics.¹ Bowen (1962)² used these materials in the development of composite resins that were reported to the dental profession in 1963.³

Praffenbarger, Sweeney and Bowen (1967)⁴ bonded porcelain teeth to acrylic resin using silane solution as the coupling agent. Semmelman and Kulp's⁵ study found that failure occurred, not at the tooth resin interface but within the body of the porcelain, indicating a true bonding.

Meyerson⁶ concluded that cold-cured resins produced a stronger bond than mechanically retained porcelain teeth, but that thermal cycling was detrimental to the bond. A clinical study of porcelain teeth in cold-cured dentures indicated that retention by bonding with silane solution was as satisfactory as mechanical retention.⁷

The first positive results of a study on the bonding of composite resin to porcelain were reported in 1977.⁸ In that study, Eames et al. concluded that some bonding agents are effective in repairing fractured porcelain. Fusion* and Den-Mat were evaluated under several laboratory conditions. The composite resins tested with Fusion gave considerably higher values than those of the Den-Mat system. Fusion has been identified as containing a commonly used bonding chemical (silane) and other proprietary agents. It was found to enhance the repair of fractured porcelain with composite resin but did not improve bonding to gold. Den-Mat gave lower, but to the authors, acceptable values as a system for repairing porcelain.⁸

The authors concluded that "when Fusion or Den-Mat, supplemented with unfilled resin, are applied to roughened porcelain, composite resins may provide adequate temporary or emergency repair. No available product can be expected to repair porcelain or exposed metal permanently".⁸

Newberg and Pameijer⁹ reported in 1978 that a system of bonding composite resins to dental porcelain with a silane solution produced a reliable bond. Tests were performed on buccal surfaces of 84 denture teeth. The specimens treated with silane solution appeared to have significantly higher resistance to shearing

forces than the control specimens. The authors claimed that this technique "may" be a clinical solution to intra-oral repair of fractured or chipped porcelain restorations.

In 1979, Eames and Rogers¹⁰ reported that porcelain repairs with bonding agents and composite resin became more retentive after one year. In a 12-month follow-up of an earlier study, Den-Mat and Fusion demonstrated an appreciable increase in retention and Fusion gave the greatest retention.

In 1979, Dent¹¹ reported from clinical experience that success of silane bonded repairs should not be expected for periods longer than 2 or 3 years. He also discussed the overlay ceramo-metal non-precious cast crown and the cast pin retained ceramo-metal repair restoration as more permanent alternatives. These are indirect procedures involving a laboratory and require more than one appointment.

Somewhat of a breakthrough occurred in recent years in Japan with the development of two new adhesive composite materials. The history of their development, their properties and their comparative advantages are reported in the Proceedings of the International Symposium on Adhesive Prosthodontics.²⁰ Despite the fact that the research reports read much like manufacturers' opinions, these materials deserve serious consideration in the clinical dentists' armamentarium.

The first, which is a combination of 4-META (methacryloxyethyl trimellitic anhydride) and BB-O (Trubutyl borane oxide), was developed by Dr. Masuhara. The commercial product, Super Bond, is claimed to be adhesive to some dental alloys and to tooth substance.^{21,22,23} The monomer includes a coupling and wetting agent that allows flow into microscopic crevices. Nevertheless, a large number of clinical failures occurred in Japan.²²

Development then began on a more advanced adhesive which was to become Panavia Ex. It contains aromatic and aliphatic methacrylates and a new phosphate monomer.²²

In an *in vitro* experiment, the bond strengths to etched enamel and unetched dentin were compared for four products. Carboxylate cement showed slightly higher bond strength than Zn phosphate cement. The Super Bond C&B value was higher than both of them and Panavia Ex was higher yet.

As for the bond to C&B restorative materials, Panavia Ex bonds to sand-blasted Ni-Cr and Co-Cr alloys and to some but not all porcelains.²² For gold

alloys, a combination of sandblasting (Micro Etcher) and tin plating (Kura-Ace) is recommended. This solves some laboratory veneering problems but still leaves the clinician without a reliable system for bonding to precious metal.

To achieve the best bond with porcelain, the surface should be roughened with a diamond point and etched with hydrofluoric acid.^{24,25} Proper acid etching removes the glaze to leave a frosted appearance. Available products to be used with great care are:

- A. Ceram-etch, Gresco Products, 5 minutes, 9.5% hydrofluoric acid.
- B. Porcelain Etch, Ultradent Products Inc, 5 minutes, 9.5% hydrofluoric acid.
- C. Porcelatch, Cosmedent, 5 minutes, 9.5% hydrofluoric acid. Rubber dam isolation is recommended.

Highton, Caputo and Matyas,¹² in September 1979, reported that a repair system using a bonding agent (Fusion or Den-Mat) with *acrylic resin* is significantly stronger than a repair system using a specific *composite resin*.

In 1981, Nowlin, Barghi and Norling¹³ compared 1) Den-Mat bonding agent and Den-Mat repair material, 2) Fusion bonding agent used with Concise, and 3) Cervident bonding agent and Cervident restorative material. Fractured porcelain bars repaired with Fusion/Concise displayed significantly greater repair strength ($p < .05$) than bars repaired with Den-Mat and Cervident. The low repair strengths of the tested materials indicate that their use is a temporary clinical procedure.

Ferrando et al.¹⁴ reported in 1983 that Enamelite 500 when used with Fusion was superior to four other materials in that it had the highest tensile strength and the least leakage at the resin porcelain interface.

In a subsequent study in 1985, Bello and his associates¹⁵ reported that Enamelite 500 was superior to Silanit with contact resin and Isopast, Enamelite 500 (plus Experimental Primer), and Den-Mat, respectively.

Gregory, Hagen and Powers,¹⁶ in 1988, evaluated bond strengths of porcelain/composite resin repair samples using five different repair liquids and two composites. The composites were Command Ultrafine and Silux. The bonding agents were Porcelain Repair Liquid, Silanit, Scotchprime, Fusion, and Ultrabond. Repairs made with the repair liquid and composite of a single manufacturer did not always perform better than heterogeneous combinations. Bonding agent

Scotchprime with Ultrafine composite showed the greatest bond strengths of the combinations tested, both initially and after the 28-day interval. Fractures of all specimens were caused by "adhesive" failures occurring at the interface.

Calamia et al.,¹⁷ in 1987, reported results based on a 6-month to 3-year clinical study. Ultra Bond was rated a superior composite resin for bonding porcelain laminate veneers to enamel. This could suggest that it is also a superior repair material for fractured porcelain. Their findings, however, are not consistent with results from a more recent study by Gregory, Hagen and Powers.¹⁶

Cochran and his associates,¹⁸ in 1988, tested the efficacy of five commercial repair systems *in vitro* for both glazed and roughened porcelain. The systems were from Den-Mat, Kerr, Taub, 3M, and Vivadent. The Kerr, 3M and Vivadent materials had similar bond strengths and exhibited cohesive failure in the restorative (repair) resin. The Den-Mat and Taub products were significantly weaker and exhibited at least partial adhesive failures. The bond was better to roughened porcelain than to glazed porcelain for four out of the five systems and the same for the Kerr system. This result is consistent with the findings of Jochen and Caputo¹⁹ in 1977, when they reported that roughened porcelain denture teeth produced a better bond than glazed porcelain teeth.

Limitations of bond

Despite significant advances, one must conclude from a review of the literature and from clinical experience that resin and composite resin repair of porcelain fused to metal restorations has limited longevity (2 to 3 years) and is effective only occasionally. Silane agents (Prilane by Gresco, Scotchprime by 3M, Cerinate-prime by Den-Mat, Porcelain Repair Primer by Kerr) and acid etching of porcelain improve the retention to the repair. However results are not consistent and predictable. The limited shelf life of silane may be a contributing factor. The efficacy of acid etching of porcelain cannot be confused with that of acid etching of human enamel. Results from clinical studies are not yet available for 4 META and Panavia EX.

A clinically proven chairside repair procedure

The step-by-step technique that follows has enabled the author to do repairs with

* A list of products and their manufacturers appears at the end of the article.



Fig. 1. Fractured mesio-incisal angle of 11 pontic within an 8-year-old multiple abutment fixed perio-prosthesis.

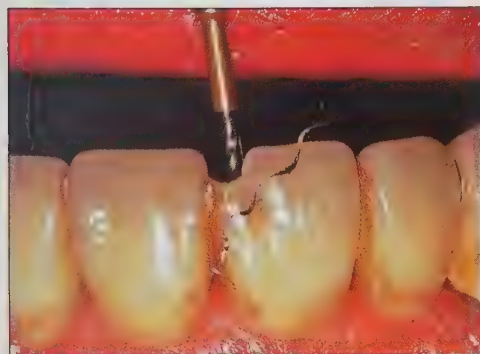


Fig. 2. Resistance form established in porcelain. A 2 mm deep pin channel is prepared with a 0.027 inch Kodex twist drill in metal substructure.

long-lasting results (10 years and more). Recent advances in materials and technique can only contribute to an even better prognosis.

Factors to consider in planning a repair procedure are: the location of the fracture, the size and shape of the fracture and the forces to which the repair is subjected during mastication and bruxism. The prognosis is better for repairs on anterior teeth than on posterior teeth and is best when the repair extends minimally onto the functional aspect of the tooth.

A. Repair of fractured porcelain when no metal is exposed

Using a coarse diamond, a shoulder 0.5 mm to 1.5 mm deep is prepared at 90° to the cavo surface around the entire periphery of the fracture. A box form with parallel opposing walls is developed, where possible, to a depth that does not penetrate the opaque layer. The gingival seat can be established at different levels to correspond with the shape of the defect.

No retentive undercuts are made that could weaken the existing porcelain. However, parallel opposing walls and, in some instances, contact with adjacent porcelain veneers provide some retention. The design of the preparation in porcelain is intended to provide: 1) resistance form,

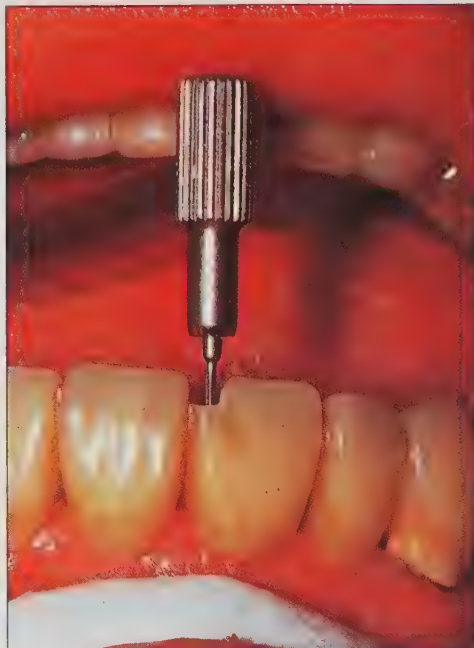


Fig. 3. Thread tapped with No. 17 Splint mate system part E threader to receive 0.031 inch TMS pin.



Fig. 5. Pin bent to provide maximum retention and support, then cut to length.

2) bulk for restorative repair material, and 3) some retention.

The cut porcelain surfaces are acid etched for 5 minutes with 9% hydro-fluoric acid. A rubber dam application is recommended for that procedure. Upon washing and drying the preparation, the roughened surfaces assume a frosted appearance which enhances retention.

4 META is applied to the preparation, employing a brush-on technique. The monomer contains a wetting and coupling agent which permits flow of the repair material into microscopic crevices. The application of the repair material in small increments permits excellent adaptation, while minimizing the effects of polymerization shrinkage.

The material when set, trims and polishes like unfilled acrylic resins yet possesses a surface hardness comparable to most composites. Because the material is translucent, it assumes the colour of the underlying and surrounding porcelain. For that reason, it is particularly



Fig. 4. 0.031 inch TMS pin passively installed to base of pin hole.

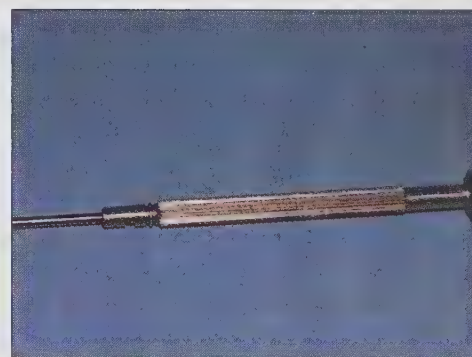


Fig. 6. Whaledent wrench facilitates proper pin positioning.



Fig. 7. Final esthetic restoration adjusted for minimal contact in all excursions. Repair functioned uneventfully for life of the fixed prosthesis – another 10 years.

suited for repairs of the incisal edge where metal substructure is not exposed.

Another use of 4 META is to apply it for the bonding layer and to sandwich composite resin over it. For repairs that require more opacity Panavia Ex can be applied instead of 4 META. It too can be used alone or in a sandwiched combination with composite resin. The proper mix

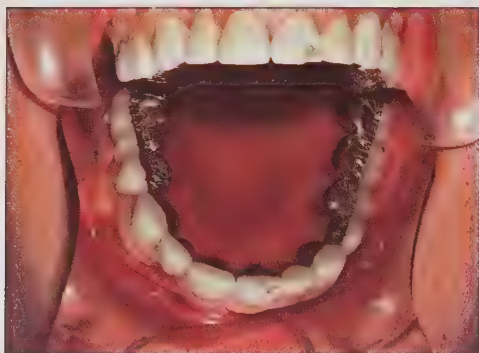


Fig. 8. Fractured disto-incisal angle of 21 within a complex 11-year-old full upper fixed prosthesis. Fracture caused by external trauma.

of powder and liquid results in a mass which flows readily into microscopic crevices. It consequently can be applied where desired with a fine brush. The bond is ostensibly a physical one, i.e. a close adaptation to roughened etched surfaces, rather than a chemical adhesion as manufacturers' promotions tend to imply.

If for some reason such a repair fails, it can only be improved by gaining *more mechanical* retention. This can be done by extending the preparation over more surfaces to take advantage of opposing retentive walls or to penetrate the opaque layer of porcelain to gain some additional mechanical retention from the substructure metal in the form of multiple minute undercuts.

B. Repair of fractured porcelain when metal is exposed (Figs. 1-14)

The outline of the preparation in porcelain is determined by the size and shape of the defect. The technique is identical to what has already been described. If retention appears inadequate, more substructure metal can be exposed, into which mechanical retention can be prepared (Figs. 1, 8).

Mechanical retention

Strategic locations are selected in the metal framework for pin retention. These are areas where pin placement could provide the maximum retention as well as support for the repair composite and where possible perforation into tooth dentine would not jeopardize the pulp. The metal adjacent to the proximo-incisal line angle is usually such a location (Figs. 2, 9, 10).

A minute depression or dimple is cut into the substructure metal with a small round diamond stone rotating at high speed. This depression serves to demarcate the pin location and to permit the twist drill rotating at slow speed to engage without slipping. The pin channel is prepared with a .027 inch Kodex twist



Fig. 9. Narrow shoulder prepared in porcelain along periphery of defect. (Today the porcelain would be acid etched.)



Fig. 11. Silane primer to enhance bond followed by opaque acrylic to mask metal. (Panavia Ex is used today for that purpose.)

drill using intermittent action. A gear reduction contra-angle can be used. Metal fillings are regularly removed from the surface of the drill to avoid clogging and possible drill fracture. (Fig. 2). For penetrating hard alloys, a new, sharp, water-cooled twist drill is recommended. A depth of 1.5 mm to 2.0 mm is required for good pin retention. An ideally positioned pin channel is one directed along the cement line between the dentine of the prepared tooth and the axial and/or incisal wall of the crown. Preparations into pontics need not be as deep, as there is no metal penetration into soft dentine or cement.

A thread is now tapped into the pin channel so that it will receive a .031 inch threaded TMS pin (Whaledent Splint mate system No 17 part E threader) (Fig. 3). Unlike dentine, the substructure casting will not yield sufficiently to permit installation of a .031 inch self-threading TMS pin. The tapping permits passive installation of the pin to the full depth of drilled pin channel.

The part E threader is a thin, delicate instrument that must be used with care. It is introduced into the pin channel and is turned clockwise with gentle pressure, advancing only one quarter turn before retreating. This motion is repeated until the pin channel has been threaded to its full depth. Bending the instrument or



Fig. 10. Pin installed along distal wall of crown and bent to maximize retention and support.



Fig. 12. Final composite resin repair at time of completion. Restoration still functioning 10 years later.

over zealous twisting can cause a fracture and new pin sites are not readily found. Repeated motion and removal ensure an accurate machining of the thread which will now easily receive a .031 inch TMS pin.

The .031 inch TMS pin is rotated securely into place, preferably by hand, to ensure complete seating (Fig. 4). If necessary, the pin is bent with the wrench supplied in the TMS kit to improve its position for maximum support of the repair composite. (Figs. 5 and 6).

It is cut to length with safety wire cutters or with an inverted cone diamond point rotating at high speed. The pin must be supported with pliers when rotary instruments are used to reduce it.

More than one strategically placed pin may be required for some repairs (Fig. 13). It is also possible to achieve more retention by roughening or nicking the metal substructure with a small inverted cone carbide drill rotating at high speed.

Intra oral sandblasting further roughens the metal (Micro-Etcher).²⁴ The etched porcelain is primed with a thin layer of silane. A layer of Panavia Ex regular or opaque is painted on over the prepared metal and pin. It can also extend onto the etched porcelain short of the cavo surface (Fig. 11).

The repair can now be completed with

a light cured composite of the dentist's choice. It is best to wait 24 hours for final finishing. For small defects near the incisal edge 4 META can be applied in small increments with a brush-on technique. It is more translucent than most composite resins and less brittle. With the brush-on technique the adaptation is excellent.

An acceptable long-lasting esthetic and functional chairside repair is achieved (Figs. 7, 12, 14), which may or may not be serviceable for the life of the prosthesis, but which can easily be re-surfaced with new composite resin, if the need arises.

These techniques, when followed with reasonable care, elevate the chairside repair of ceramo-metallic restorations from a temporary procedure to one of relative permanence. Δ

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Products and Manufacturers

Ceram-etch
Gresco Products, Inc., Stafford, TX 77477, USA.
Cerinatprime
Den-Mat Corp., Santa Maria, CA 93456, USA.
Command Ultrafine
Kerr/Sybron, Romulus, MI 48174, USA.
Enamelite 500
Lee Pharmaceuticals, South El Monte, CA, USA.
Fusion
George Taub Products & Fusion Co. Inc., Jersey City, NJ 07307, USA.
Isopast
Vivadent (USA) Inc., Tonawanda, NY 14150, USA.
Kodex Twist Drill
Whaledent International, New York, NY 1001, USA.
Kura-Ace
Kura-Ace, Osaka, Japan.
Micro Etcher
Danville Engineering, Danville, CA 94526, USA.
Panavia Ex
J. Moritz Dental Corp of America, Tustin, CA 92680, USA.
Porcelain Etch
Ultradent Products, Inc., Salt Lake City, UT 82124, USA.
Porcelain Repair Liquid and Primer
Kerr/Sybron, Romulus, MI 48174, USA.
Porcelatch
Cosmedent Inc., Chicago, IL 60640, USA.
Prilane
Gresco Products, Inc., Stafford, TX 77477, USA.
Safety Wire Cutters
Star Dental, Valley Forge, PA, 19482, USA.
Scotchprime
3-M Dental Products, St. Paul, MN 55144, USA.



Fig. 13. Fractured disto-incisal angle of 22 within upper fixed splint. Note precision attachment on D of 22, facets due to bruxism and missing canine. Pins installed along distal and incisal walls of crown.



Fig. 14. Final composite resin repair with precision attachment partial denture in place. Still functioning more than 10 years later despite unfavorable anterior guidance, bruxism and possible metal deformation adjacent to precision attachment.

Silanit
Vivadent (USA) Inc., Tonawanda, NY 14150, USA.
Silux
3-M Dental Products, St. Paul, MN 55144, USA.
Super Bond
Sun Medical Co. Ltd., Kuoto City, Japan.
Ultra Bond
Den-Mat Corp., Santa Maria, CA 93456, USA.

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(acyclovir)
ZOVIRAX OINTMENT 5% (4 g and 15 g tubes)

INDICATIONS AND CLINICAL USE: ZOVIRAX Ointment 5% is indicated for the management of initial episodes of genital herpes simplex infections. It is also indicated in the management of nonlife-threatening cutaneous herpes simplex virus infections in immunocompromised patients. The prophylactic use of this preparation has not been established.

In genital herpes, appropriate examinations should be performed to rule out other sexually transmitted diseases.

These indications are based on the results of a number of double-blind, placebo-controlled studies which examined changes in virus excretion, healing of lesions and relief of pain. Because of the wide biological variations inherent in herpes simplex infections, the following summary is presented merely to illustrate the spectrum of responses observed to date. As in the treatment of any infectious disease, the best response may be expected when therapy is begun at the earliest possible moment.

In immunocompromised patients, 93% were virus negative after 5 days of topical ZOVIRAX therapy whereas only 35% of placebo recipients were virus negative at the same time.

In patients with herpes labialis, there was a significantly greater decrease in the amount of virus excreted after one day of therapy in those receiving ZOVIRAX within 8 hours of the onset of cold sores when compared to identically treated placebo patients.

Because complete re-epithelialization of herpes-disrupted integument necessitates recruitment of several complex repair mechanisms, the physician should be aware that the disappearance of visible lesions is somewhat variable and will occur later than the cessation of virus shedding. All immunocompromised patients who received topical ZOVIRAX had healed their lesions 23 days after the initiation of a 10-day course of therapy. 75% of placebo patients had healed lesions at that point. Some placebo patients continued to have visible lesions for more than 30 days.

Pain associated with herpes infections is highly variable in frequency and intensity. One hundred percent of the ZOVIRAX-treated immunocompromised patients were pain-free by day 23 versus 70% of placebo-treated patients.

Whereas cutaneous lesions associated with herpes simplex infections are often pathognomonic, Tzanck smears prepared from lesion exudate or scrapings may assist in the diagnosis. Positive cultures for herpes simplex virus offer the only absolute means for confirmation of the diagnosis.

CONTRAINDICATIONS: ZOVIRAX Ointment 5% is contraindicated for patients who develop hypersensitivity or chemical intolerance to any of the components of the formulation, such as polyethylene-glycol.

WARNINGS: ZOVIRAX Ointment 5% is intended for topical use only and should not be used in the eye or on mucous membranes.

PRECAUTIONS: The recommended dosage, frequency of application and duration of treatment of ZOVIRAX Ointment 5% should not be exceeded.

It is not known whether acyclovir is excreted in human milk.

Because many drugs are excreted in human milk, caution should be exercised when ZOVIRAX is administered to a nursing mother.

ZOVIRAX Ointment 5% should be used during pregnancy only if the physician feels the benefit will outweigh the possible harm to the fetus.

Safety of use of ZOVIRAX Ointment 5% in children has not been established.

There exist no data, at this time, which demonstrate that the use of ZOVIRAX Ointment 5% will prevent transmission of infection to other persons.

Since most cutaneous herpes simplex virus infections result from reactivation of latent virus, it is unlikely that ZOVIRAX Ointment 5% will prevent recurrence of infections when applied in the absence of signs and symptoms. ZOVIRAX Ointment 5% should not be applied in an attempt to prevent recurrences; application should commence only at the earliest prodromal sign of disease onset.

Although clinically significant viral resistance associated with the use of ZOVIRAX Ointment 5% has not been observed, this possibility exists.

ADVERSE REACTIONS: Because ulcerated genital lesions are characteristically tender and sensitive to any contact or manipulation, patients may experience discomfort upon application of ointment. In the controlled clinical trials, mild pain (including transient burning and stinging) was reported by 103 (28.3%) of 364 patients treated with ZOVIRAX Ointment 5% and by 115 (31.1%) of 370 patients treated with placebo. Treatment was discontinued in 2 of these patients. Other local reactions among acyclovir-treated patients included pruritus in 15 (4.1%), rash in 1 (0.3%) and vulvitis in 1 (0.3%). Among the placebo-treated patients, pruritus was reported by 17 (4.6%) and rash by 1 (0.3%).

In all studies, there was no significant difference between the drug and placebo group in the rate or type of reported adverse reactions.

SYMPTOMS AND TREATMENT OF OVERDOSAGE: Overdosage by topical application of ZOVIRAX Ointment 5% is unlikely because of limited transcutaneous absorption.

DOSAGE AND ADMINISTRATION: Apply ZOVIRAX Ointment 5% liberally to the affected area 4 to 6 times daily for up to 10 days. A sufficient quantity of ointment should be applied to adequately cover all lesions. A finger cot or rubber glove should be used while applying ZOVIRAX in order to prevent:

- (1) autoinoculation of other body sites or
- (2) transmission of infection to other persons.

Therapy should be initiated as early as possible following onset of signs and symptoms.

AVAILABILITY: ZOVIRAX Ointment 5% is available in tubes of 4 g and 15 g. Each gram contains 50 mg acyclovir in a polyethylene-glycol base. ZOVIRAX Ointment 5% is for topical administration.

Product Monograph available on request.

Reference:

1. Whitley RJ, Levin M, Barton N, et al. Infections caused by herpes simplex virus in the immunocompromised host: Natural history and topical acyclovir therapy. *J Infect Dis* 1984;150:323-329.



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Le traitement de l'hypersensibilité dentinaire : Une étude rétrospective et comparative de deux approches thérapeutiques

René Guy Landry¹, DMD, Dipl (Perio), MSc (microb), MRCD(C)
René Voyer², BSc

SOMMAIRE

La stimulation de la dentine dénudée à la jonction énamo-cémentaire est parfois douloureuse et constitue un désagrément fort sérieux pour les patients qui en sont affectés. Une population de 244 individus souffrant d'hypersensibilité dentinaire à une dent et âgée de 18 à 48 ans a été traitée par deux agents désensibilisants. Les agents désensibilisants utilisés dans cette étude sont l'hydroxyde de calcium (catalyseur du Dycal) et le fluorure de sodium (Duraflor). L'agent désensibilisant est appliqué au site sensible, puis bruni, sans anesthésie locale, jusqu'à disparition de la couleur. Au cours de cette séance, 100 % des individus ont été désensibilisés. Les individus ont été contrôlés 1, 2, 3, 6, 13 et 26 semaines après l'application. Après 6 mois, 94 % des sujets traités avec l'hydroxyde de calcium (Dycal) et 87 % des sujets traités au fluorure de sodium (Duraflor) étaient toujours désensibilisés. Cette différence est significative à $\alpha = 0,01$ (par une analyse de variance). En conclusion, notre étude démontre l'efficacité de l'hydroxyde de calcium (Dycal) et du fluorure de sodium (Duraflor) pour le traitement de l'hypersensibilité dentinaire. Nous remarquons que l'effet de l'hydroxyde de calcium est plus durable.

Mots clefs : hypersensibilité dentinaire

ABSTRACT

Stimulation on exposed dentine at the enamo-dentinal junction is often painful and uncomfortable for the affected patient. Two hundred and forty-four subjects suffering from dentinal sensitivity, aged from 18 to 48 years old, were treated with two types of desensitizing agent. In this study, we used sodium fluoride (Duraflor) and calcium hydroxide (Dycal catalyst). The desensitizing agent is first applied on the exposed dentine and then burnished, without local anaesthesia, until all sensitivity has disappeared. After



Dr. René Guy Landry, DMD

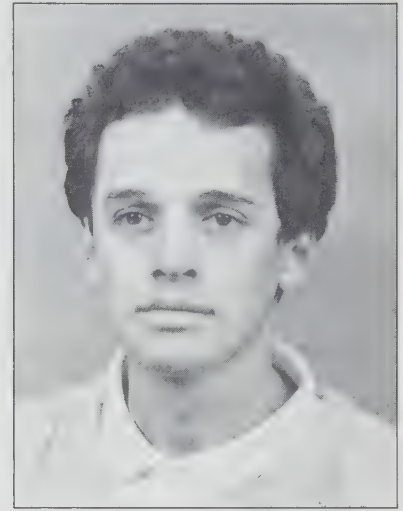
the first session, 100% of the subjects were desensitized. All subjects were seen 1, 2, 3, 6, 13 and 26 weeks after the first application. After 6 months, 94% of the subjects treated with calcium hydroxide (Dycal) and 87% of those treated with sodium fluoride (Duraflor) were still desensitized. This difference is statistically significant at $\alpha = 0.01$ (Anova test). In conclusion, our study reveals that both calcium hydroxide (Dycal) and sodium fluoride (Duraflor) are effective in the treatment of dentinal hypersensitivity. A slight significant advantage in using calcium hydroxide is also noted.

Key words: dentinal hypersensitivity

Nota : On peut se procurer au Canada les produits dont les noms suivent. Leur inclusion dans la liste ne signifie pas nécessairement que les auteurs les approuvent, pas plus qu'elle n'implique que d'autres produits comprenant des ingrédients similaires soient moins efficaces.

Demandes de tirés à part : René Guy Landry, Université Laval, École de médecine dentaire, Sainte Foy (Québec) G1K 7P4

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part d'un projet de recherche (# 4784) subventionné par le directeur de recherche de l'École de médecine dentaire de l'Université Laval

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² Étudiant inscrit au programme de doctorat en médecine dentaire à l'École de médecine dentaire de l'Université Laval

La stimulation de la dentine dénudée à la jonction énamo-cémentaire est parfois douloureuse et constitue un désagrément fort sérieux pour les patients qui la subissent (Schluger et al., 1977). Jenson (1964) rapportait qu'un patient sur quatre présente un jour les symptômes de l'hypersensibilité dentinaire. Nous ne considérons pas ici l'hypersensibilité due à des troubles pulpaire. Ce problème peut survenir sur une ou plusieurs dents et on le rencontre fréquemment au cours des traitements parodontaux (après le surfaçage ou après la chirurgie parodontale). Le fait que les racines des dents d'un patient soient hypersensibles au moment du surfaçage constitue souvent une contre-indication à la chirurgie parodontale.

On sait que 10 % des dents n'ont pas de ciment au niveau de la jonction énamo-cémentaire, et là où il y avait du ciment

au départ, son épaisseur n'a que 20 à 50 microns d'épaisseur ce qui rend sa disparition rapide lors du surfaçage radiculaire.

Les odontoblastes (**figure 1**) qui ont leurs origines dans la pulpe traversent la dentine dans le tubuli et se retrouvent près de la surface externe de la racine. Lorsque la dentine calcifiée est exposée, de 10 à 15 000 tubuli par mm² sont ouverts (Mascrès, 1986). La dentine découverte rend les tubuli dentinaires vulnérables à une variété de stimuli. Ces derniers engendrent de la douleur à partir des surfaces dentinaires exposées.

L'hypersensibilité consécutive à une thérapie parodontale est fréquente mais disparaît généralement spontanément après plusieurs semaines ou plusieurs mois. L'hypersensibilité attribuable à la récession causée par le processus de l'affection même est souvent plus persistante et peut être difficile à traiter.

L'hypersensibilité dentinaire s'explique :

1. Par la présence de fibres nerveuses intradentaires lesquelles prennent leurs origines de la pulpe. Ces fibres nerveuses peuvent se retrouver dans la lumière du tubuli sur des distances variées (**figure 2**). La fréquence est d'une fibre nerveuse par 200 à 2 000 tubuli. Le nombre de tubuli varie entre 10 000 et 15 000 par mm² (Mascrès, 1986). Le diamètre du tubuli est à sa partie interne de 2,5 µm et de 0,5 µm à la surface de la dent. C'est ainsi que nous expliquons, en partie, les différences des seuils de sensibilité dentinaire.
2. Par la théorie hydrodynamique. Selon cette théorie, l'hypersensibilité dentinaire serait due à un mouvement (Brannstrom, 1986) minime à l'intérieur du tubuli causant ainsi une déformation de l'odontoblaste et stimulation des fibres nerveuses adjacentes (Brannstrom, 1964).
3. Par l'excitation d'une fibre nerveuse via une synapse avec l'odontoblaste.
4. Par l'excitation d'une fibre nerveuse libre dans la pulpe.

Classification des stimuli responsables des dents hypersensibles

Les stimuli responsables des dents hypersensibles sont classés en quatre catégories.

1. Mécanique
 - a) les instruments en parodontie, surfaçage radiculaire
 - b) la brosse à dents (Addy et al., 1987)
 - c) certaines habitudes buccales
2. Thermique

FIGURE 1

Composantes de la dentine mises en situation dans l'hypersensibilité dentinaire

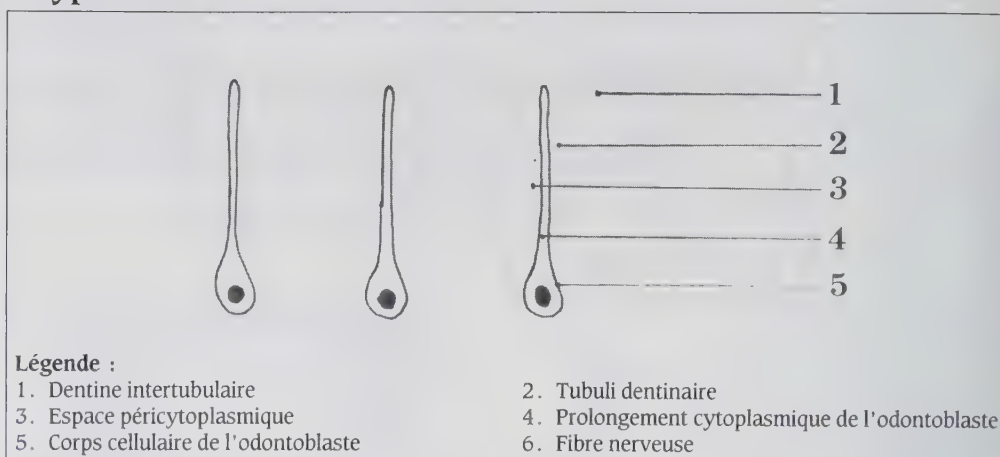
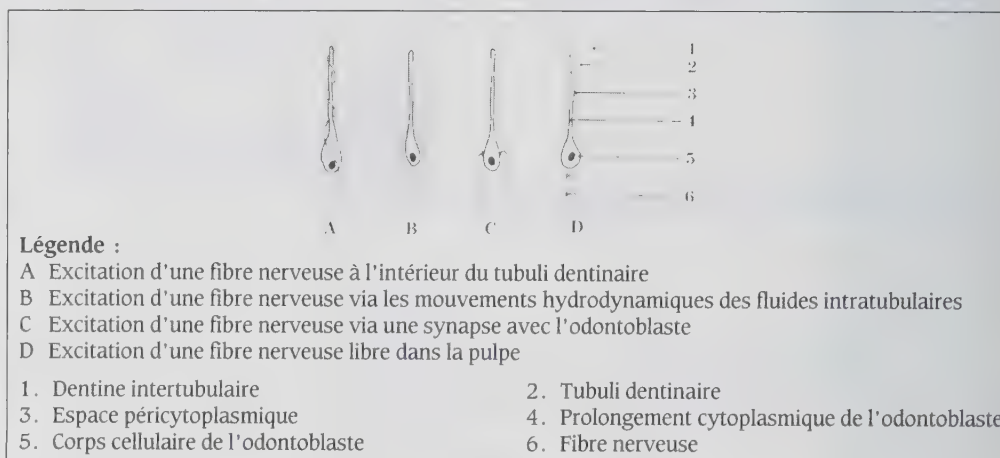


FIGURE 2

Différents mécanismes de transmission de la sensibilité dentinaire



- a) les aliments
 - b) les changements subits de température
3. Chimique
 - a) les débris alimentaires
 - b) les sucreries
 - c) l'accumulation de plaque bactérienne
 4. Autres
 - a) la prédisposition anatomique (absence de ciment à la jonction énamo-cémentaire)

Les régions radiculaires exposées qui ne sont pas sensibles peuvent le devenir par suite d'un brossage incomplet. Un brossage satisfaisant exerce un effet brunissant, désensibilisant la région affectée. Toutefois, si la plaque et les débris alimentaires ne sont pas complètement enlevés, ils se décomposent et causent la sensibilité des dents.

Diagnostics différentiels

Les principaux diagnostics différentiels

sont : la fissure microscopique, la douleur après une chirurgie parodontale, la pulpite, l'hyperhémie, le traumatisme occlusal et l'abus de médicaments libérant de l'oxygène (langue chevelue et décalcification des dents).

Mécanismes d'action des agents désensibilisants

Les mécanismes d'action des agents désensibilisants sont :

- a) La dénaturation des terminaisons nerveuses ou du matériel organique à l'extrémité des procès odontoblastiques. (Thermodent);
- b) La formation de dentine secondaire à l'intérieur de la pulpe (hygiène);
- c) Le dépôt de précipités plus ou moins insolubles (sels inorganiques) dans les tubuli ou à l'orifice, isolant ainsi le protoplasme (Sensodyne et Sensodyne F);
- d) L'inhibition de l'inflammation à l'intérieur de la pulpe par des corticostéroïdes (Mosteller, 1962);

- e) L'occlusion des tubuli par un moyen mécanique (brunissage).

Approche thérapeutique

Il n'existe aucun traitement pour l'hypersensibilité dentinaire universellement accepté et dont le taux de réussite est excellent (Berman, 1984).

L'approche thérapeutique devrait se faire en trois (3) moments distincts :

A. Les explications du phénomène, leur inconfort et les conseils d'hygiène sont essentiels.

La valeur des traitements pour les cas d'hypersensibilité dentinaire est déterminée par une réponse subjective du patient.

Il est bien reconnu qu'un effet « placebo » accompagne très souvent le traitement d'hypersensibilité dentaire. D'ailleurs, les études montrent qu'un pourcentage pouvant aller jusqu'à 42 % des patients seront soignés de façon très acceptable avec un « placebo » (sic) (Levin et al., 1973).

La réaction du patient à la sensibilité post-opératoire est grandement influencée par la manière dont il y aura été préparé. Les renseignements suivants aideront le patient à prévenir l'hypersensibilité et à y faire face :

- La sensibilité radiculaire est généralement temporaire et son intensité diminue rapidement.
- Plusieurs agents désensibilisants sont efficaces pour traiter l'hypersensibilité.
- Les aspects positifs du traitement.
- Les causes possibles de la sensibilité.
- L'importance de l'hygiène buccale.
- Les aliments qui accroissent la sensibilité sont les sucres raffinés, les agrumes et les jus de fruits.

B. Le plus important facteur de contrôle de l'hypersensibilité est l'élimination adéquate de la plaque bactérienne.

Les acides et toxines produits par les micro-organismes de la plaque irritent la pulpe par le biais des prolongements cytoplasmiques des odontoblastes. Cette irritation de la pulpe accroît sa sensibilité aux autres stimuli. Il faut garder en mémoire que le succès sera très limité quel que soit l'agent si le patient enraie mal la plaque bactérienne sur les surfaces radiculaires. Cela peut, par contre, devenir un cercle vicieux parce que l'hypersensibilité peut empêcher justement le patient de pratiquer les soins d'hygiène essentiels à son élimination.

C. L'utilisation d'agents, tel ceux utilisés par le patient et enfin ceux à usage réservé au clinicien.

Les agents utilisés pour le traitement

Il n'existe pas un agent désensibilisant idéal. Lorsqu'il y en aura un, il devra être efficace dès la première application et posséder les qualités suivantes :

1. Ne pas irriter la pulpe;
2. Ne pas causer la douleur;
3. S'appliquer facilement;
4. Agir rapidement;
5. Être effectif de façon permanente;
6. Ne pas décolorer ni tacher les dents;
7. Ne pas irriter les tissus mous;
8. Ne pas irriter le ligament parodontal;
9. Être peu coûteux.

Certains agents font maintenant partie intégrante de l'histoire de la dentisterie et ne sont plus utilisés parce qu'ils sont peu pratiques, peu sûrs qu'ils engendrent des effets secondaires irréversibles, dont la coloration intrinsèque de la substance dentaire, qu'ils sont toxiques sans oublier que leur application est plutôt douloureuse. Ces agents sont, entre autres, l'alcool benzylique, le chloroforme, le chlorure de zinc, l'essence de girofle, le formaldéhyde, la glycérine, l'huile d'olive chaude, l'hydroxyde de potassium, le nitrate d'argent, le phénol et le sel.

Les substances chimiques utilisées agissent pour la plupart par dépôt des précipités insolubles dans les tubuli dentinaires.

On classifie les agents selon leur utilisation par le patient ou par le clinicien.

Les agents utilisés par le patient

Leur utilisation peut rendre inutile un traitement par le clinicien. C'est pourquoi après les étapes A et B, on prescrira au patient une « médication » et une « technique ».

Le patient les utilise une ou deux fois par jour après les soins d'hygiène buccale usuels. Il se rince soigneusement la bouche pendant une minute ou deux sans avaler la solution. Les gels sont appliqués avec la brosse à dent ou un autre instrument. Le patient ne doit pas manger, boire ou se rincer la bouche pendant la demi-heure suivant l'application. La désensibilisation n'est généralement pas immédiate mais survient après plusieurs utilisations quotidiennes.

Les patients peuvent également utiliser des agents désensibilisants offerts en dentifrices. Les dentifrices qui se sont révélés efficaces contiennent du chlorure de strontium 10 % (Sensodyne), du nitrate de potassium 5 % et monofluorophosphate de sodium 0,8 % (Sensodyne F), du monofluorophosphate de sodium 0,76 % (Colgate) ou du formol (Thermodent).

1. **Fluorures** (Musthy, 1973, Collins, 1984).

Il existe une brosse à dent opérant sur le même principe que l'appareil iontophorétique. Avec cette brosse, on utilise les fluorures que l'on retrouve sur le marché. On peut utiliser ces fluorures sans la brosse à dent.

2. **Chlorure de strontium** (Sensodyne). (Blitzer, 1967; Ross, 1961; Toto, 1958).

Le chlorure de strontium 10 % est aussi un agent désensibilisant que la patient peut utiliser. On le retrouve dans la pâte à dent « Sensodyne ». Le chlorure de strontium pénètre et obstrue les tubuli dentinaires pour former une barrière (Kun, 1976). Cette obstruction, en prenant pour acquis qu'il s'agit du processus mis en cause, prévient le mouvement du fluide dans le tubuli et, par conséquent, l'excitation des fibres nerveuses.

3. **Nitrate de potassium.**

Le nitrate de potassium 5 % en association avec le monofluorophosphate de sodium (MFP) 0,8 % se retrouve dans les pâtes dentifrices « Sensodyne F » (Hodosh, 1974) et dans « Denquel » (Silverman 1985). L'agent actif augmente la concentration en potassium extra-cellulaire après le brossage (Pashly, 1985). Le MFP 0,8 % agit uniquement pour la prévention de la carie. La réduction de l'activité des nerfs sensitifs, soit la diminution de la réponse aux stimuli douloureux, est due à l'augmentation de la concentration des ions potassium autour de ceux-ci (Markowitz et al., 1985; Bilotto et al., 1986). La réponse thérapeutique paraît évidente après deux (2) semaines et augmente de façon continue au cours des douze (12) semaines de l'étude clinique (Silverman, 1985).

4. **Dentifrice au MFP** (Shapiro et al., 1970).

Le monofluorophosphate de sodium 0,76 % se retrouve dans la majorité des dentifrices fluorés à l'exception presque unique de « Crest ». Les résultats sont très controversés. Ainsi, Shapiro et al. (1970) se servent d'un dentifrice au MFP pour le groupe contrôle.

La théorie sur les mécanismes d'action de l'ion fluor s'explique ainsi :

1. L'affinité de l'ion fluor pour les sels de calcium augmenterait la calcification des tubuli;
2. Le fluor diminuerait la vitalité pulpaire;
3. Une action enzymatique serait possible;
4. La captation des électrolytes par l'ion fluor diminuerait la quantité d'électrolytes disponibles pour la conduc-

tion normale de la douleur.

Il faut se rappeler que les solutions de fluorure doivent être placées dans des contenants autres qu'en verre afin d'éviter une réaction avec ce matériau.

5. Formaline (Hazen et al., 1968)

En rince-bouche, la composition du rince-bouche pourrait être la suivante :

Formaline (SUP)	20,0
Alcool (USP)	200,0
Essence de menthe	2,0

10 gouttes dans 1/3 de verre d'eau chaude

Rincer pour 3 minutes — b.i.d.

6. Hydroxylapatite synthétique (Hüttemann et al., 1987)

L'hydroxylapatite synthétique 17 % P/P est retrouvé dans la pâte dentifrice ORAL B pour le traitement de l'hypersensibilité. Il fut impossible aux co-auteurs d'obtenir une copie d'une étude complète à double insu sur le dentifrice et dont on connaît l'existence.

Les agents utilisés par le clinicien

Si l'usage est exclusif au clinicien, c'est en raison de la concentration de l'agent actif. La quantité appliquée et la zone d'application sont, règle générale, restreintes. Il en est ainsi à cause des possibilités d'irritation des tissus ou des réactions toxiques.

Les substances chimiques utilisées agissent pour la plupart par dépôt des précipités insolubles dans les tubuli dentinaires. Parmi toutes les substances utilisées et celles vendues, les plus populaires sont celles contenant du fluorure. L'action des fluorures est particulièrement intéressante chez les patients sujets aux caries radiculaires et elle peut être complétée par celle des fluorures utilisés par le patient.

1. **Silicofluorure de sodium** Na_2SiF_6 (0,6 à 0,9 %) dans une solution aqueuse saturée. (Stout, 1955).
2. **Fluorure de sodium** (2 à 4 %), Kaolin et glycérine (pâte). (Lukomsky et al., 1941)

Hoyt et Bibly (1943) ont suggéré une pâte constituée de façon égale de fluorure de sodium 33 %, kaolin et glycérine pour le traitement de la sensibilité radiculaire. C'était une modification de Lukomsky (1941). D'autres auteurs (Clement 1947; Everett et al. 1966 et Everett 1974) rapportent des résultats positifs. Greenhill et Pashley (1981) postulent que le blocage mécanique est dû soit au fluorure ou au kaolin, ou les deux. Cependant, Colaneri (1952) suggère que la glycérine peut avoir des propriétés désensibilisantes.

3. **Hydroxyde de calcium** $\text{Ca}(\text{OH})_2$ (catalyseur du dycal) et de magnésium $\text{Mg}(\text{OH})_2$ (Étude de Levin et al., 1973 : 110 patients et 330 dents traitées). Le pH alcalin (ph 12) de l'hydroxyde de calcium peut irriter les tissus mous; ils peuvent être protégés avec un lubrifiant. L'utilisation de ce produit devrait être limité aux surfaces radiculaires les plus grandement exposées afin de permettre une utilisation sécuritaire. Greenhill et Pashley concluent à une réduction de 21 % du mouvement des fluides dans le tubuli dentinaire.

4. **Fluorure de sodium** (Duraflor, anciennement Duraphat) en association avec un vernis protecteur du type copalite.

Ce produit s'applique facilement et rapidement; n'occasionne pas de coloration ni intrinsèque ni extrinsèque; n'irrite pas le tissu kératinisé; ne provoque pas de douleur lors de son application.

Chaque tube de Duraflor contient 50 mg de fluorure de sodium USP par ml de vernis fluoré. C'est l'équivalent de 22,6 mg de fluor par ml. Le vernis fluoré se solidifie sous l'action de la salive. La captation du fluor débute dès l'application du produit et continue pendant plusieurs heures après la fin du traitement. Le film persistant partira sous l'effet du brossage subséquent. Si on applique le vernis fluoré uniquement sur une hémicarcade, il est recommandé que le patient ne mas-tique que du côté non traité afin d'éviter un décollement prématuré du vernis.

5. **Silicofluorure de sodium** durant 2 minutes et une seconde application d'une solution d'hydroxyde de calcium pour un autre 5 à 20 minutes.

En offrant plus de calcium au moment de la précipitation, on forme une barrière plus épaisse suffisante à prévenir le transfert de stimuli.

6. **Chlorure de strontium et fluorure de sodium** (Shapiro et al., 1970).
7. **Oxalate de dipotassium** (Brough et Johnson, 1989).
8. **Oxalate de monopotassium monohydrogéné** (Protect de Butler) (Brough et Johnson, 1989).
9. **Stéroïde** (Prednisone) (Mosteller, 1962).

À ceci s'ajoutent les appareils d'iontophorèse (Chayes-Siemon) (Jensen, 1964; Irving, 1958; Gangarosa, 1981; Lutins, 1984; Walton, 1979; Schaeffer, 1971; Wilson, 1984) et l'emploi d'adhésifs amélo-dentinaire (Scotchbond II).

C'est une technique efficace mais pas

supérieure à d'autres méthodes plus économiques et demandant un investissement moindre. Une étude semble montrer que l'iontophorèse avec un fluorure de sodium serait supérieure au fluorure de sodium seul (Kern, 1989). Il existe un manque évident d'études à double insu afin d'évaluer convenablement cet appareil.

Le pinceau est connecté au pôle négatif (cathode) et le patient tient la poignée (pôle positif-anode), tandis que le dentiste applique le pinceau imprégné d'une solution de fluorure de sodium 1 à 2 % au niveau des régions sensibles. Le boîtier à ampérage est placé à 20 (l'équivalent d'environ 0,4 milliampères) pour 1 minute. Une décharge électrique directe est appliquée afin de promouvoir l'imprégnation des ions négatifs de fluorure dans la dentine.

Le principe est le suivant : le fluorure sur ion négatif est repoussé par la cathode et projeté dans la direction du courant (vers la surface de la dent). L'iontophorèse augmente la pénétration et l'attache des ions de fluorure à la dent (Ciancio, 1986). L'hypothèse de Schaeffer (1971) veut que l'augmentation des ions fluorure dans le tubuli cause une micro-précipitation des ions calcium et fluorure lesquels servent à bloquer la stimulation hydrodynamique.

Enfin, s'il arrivait que tout a été essayé et qu'aucune technique ne se soit révélée satisfaisante, nous vous recommandons l'utilisation de l'adhésif amélo-dentinaire Scotchbond II de 3M pour recouvrir la dentine exposée.

Le Scotchbond II contient un adhésif photopolymérisable ainsi qu'un apprêt dentinaire pour préparer la dentine. Dans un premier temps, il faut isoler la dent avec une digue. Si nécessaire, préparer une cavité et protéger la paroi pulpaire avec un hydroxyde de calcium dans les endroits les plus proches de la pulpe. Si le site à restaurer contient de l'émail, alors il faut la mordancer. Le site est maintenant prêt pour recevoir l'apprêt dentinaire qu'on laissera en place pour 60 sec. puis qu'on asséchera pendant 15 sec. avec un jet d'air sec (ne pas rincer à l'eau). Prendre note que l'application de l'apprêt dentinaire sur l'émail mordancé sera sans effet secondaire sur la force de son lien avec l'adhésif. Une fois le site bien asséché, on applique l'adhésif sur la dentine et l'émail mordancé, puis on polymérise à la lumière visible pour 20 sec. Il suffit alors d'obturer avec un composite, polymériser et polir le matériau.

Il faut être prudent lors de ces manipulations pour ne pas causer d'hypersensibilité là où il n'y en avait pas, comme par

exemple, lors d'une mauvaise utilisation des crampons et/ou des disques et fraises à finition.

Il s'agit dans cette étude d'évaluer d'une façon rétrospective deux traitements pour l'hypersensibilité dentinaire. Il s'agit, d'une part, du brunissage du fluorure de sodium (Duraflor) et, d'autre part, du brunissage de l'hydroxyde de calcium (Dycal).

Matériel et méthode

Une population de 244 individus souffrant d'hypersensibilité dentinaire à d'une seule dent et âgée de 18 à 48 ans, dont 158 de sexe féminin d'âge moyen 33,9±6,9 ans et 86 de sexe masculin d'âge moyen 35,4±6,3 ans, a été traitée par deux agents désensibilisants. Afin de s'assurer du diagnostic pré-opératoire, un explorateur #5 bien affûté est utilisé sur la surface radiculaire pour retrouver la zone hypersensible. Les agents désensibilisants utilisés dans cette étude sont l'hydroxyde de calcium (catalyseur du Dycal) qui a servi à traiter 140 sujets (48 hommes et 92 femmes) et le Duraflor pour les 104 autres sujets (38 hommes, 66 femmes) (Tableau 2). Les sujets ont été suivis pendant 26 semaines suivant l'application unique de l'agent désensibilisant.

Chaque site d'application est isolé puis nettoyé avec du chloroforme ou du benzène et détartré si nécessaire pour permettre à l'agent désensibilisant d'atteindre l'extrémité des tubuli dentinaires. Le champ de travail est gardé sec avec l'utilisation d'une pompe à salive.

Chaque site est réisolé avec une compresse et la dent est asséchée doucement avec une boulette d'ouate. L'agent désensibilisant est appliqué au site sensible, puis bruni, sans anesthésie locale avec un brunissoir de type queue de castor jusqu'à disparition de la douleur, cela pouvant prendre de 5 à 25 min. Par la suite, une cire verte d'occlusion est appliquée sur le site pendant 6 à 12 heures, afin de permettre à l'agent actif d'y demeurer plus longtemps. Lors de cette séance, 100 % des sujets ont été désensibilisés.

Lorsque l'hydroxyde de calcium (catalyseur du Dycal) était utilisé, la gencive à proximité de la dent était préparée par l'application d'un séparateur du type vaseline afin de la protéger contre l'hydroxyde de calcium qui est un irritant pour la gencive.

Les sujets se sont présentés à six rendez-vous de contrôle 1, 2, 3, 6, 13 et 26 semaines après l'application de l'agent désensibilisant afin de vérifier si la dent est toujours désensibilisée. Nous avons utilisé l'analyse de variance pour

TABLEAU 1

Répartition des patients selon le sexe et l'âge

ÂGE	HOMMES	FEMMES
20 ans et moins	0	9 (19,3 ± 0,9)
21-25	8 (21,9 ± 1,1)	14 (23,3 ± 1,7)
26-30	4 (28,0 ± 1,8)	9 (27,4 ± 1,2)
31-35	29 (33,0 ± 1,4)	65 (33,0 ± 1,4)
36-40	34 (38,5 ± 1,4)	38 (37,9 ± 1,4)
41-45	5 (43,2 ± 1,8)	11 (42,3 ± 1,6)
46 ans et plus	6 (46,3 ± 0,5)	12 (47,0 ± 0,9)
Total	86	158

Légende : nombre d'individus (âge moyen ± écart-type)

évaluer l'hypothèse que : le % d'efficacité de l'hydroxyde de calcium (Dycal) et du fluorure de sodium (Duraflor) est le même. Le niveau de signification était fixé à $p \leq 0,01$.

Résultats

Les résultats de notre étude révèlent que :

- Au premier rendez-vous (temps 0), 100 % des individus traités ont été désensibilisés.
- Lors des rendez-vous de rappel aux semaines 2, 3, 6 et 13, un certain nombre de sujets n'ont pu être contrôlés à cause d'un manque de disponibilité de leur part.
- À 26 semaines après le traitement, tous les individus se sont présentés. 94 % des individus traités à l'hydroxyde de calcium (Dycal) et 87 % de ceux traités au fluorure de sodium (Duraflor) étaient toujours désensibilisés.

Discussion

Les résultats de cette étude démontrent bien l'efficacité de l'hydroxyde de calcium (Dycal) et du fluorure de sodium (Duraflor) dans le traitement de l'hypersensibilité dentinaire car 100 % des individus traités dans les deux groupes ont été désensibilisés à la suite de l'application et du brunissage de l'agent sur la dentine dénudée.

Cependant, nous notons que le traitement à l'hydroxyde de calcium a un effet plus durable par rapport au fluorure de sodium (Duraflor). Cette différence est statistiquement significative après 26 semaines.

Nous expliquons les variations intra-groupe observées aux semaines 2, 3, 6 et 13 par le fait que les individus ne se sont pas tous présentés à leur rendez-vous de rappel.

Cette étude confirme les résultats de Levin et al. (1973), qui avaient étudié l'efficacité de l'hydroxyde de calcium (Dycal) et trouvé un pourcentage de

TABLEAU 2

Répartition des deux types de traitement selon le sexe

	Total	Traitement	
		Duraflor NaF	Dycal Ca(OH) ₂
Hommes	86	38	48
Femmes	158	66	92
	244	104	140

soulagement complet de 82,2 % et une amélioration partielle de 16,1 % après 26 semaines. Dans notre étude, le % de soulagement total est de 94 %. Les résultats supérieurs de notre étude s'expliquent par le brunissage de la surface radiculaire.

L'American Dental Association Council of Dental Therapeutics suggère quatre (4) principes pour évaluer la réduction de l'hypersensibilité dentinaire à la suite d'un traitement (ADA, 1986). Ces principes sont : 1) les tests doivent être quantifiables et reproductibles; 2) le seuil de réponse doit être connu et quantifié; 3) le stimulus expérimental doit être confiné à la région radiculaire sensible; 4) un stimulus approprié doit être utilisé.

En raison du caractère rétrospectif de cette étude, les quatre (4) principes n'ont pas toujours été facilement vérifiables lors de la compilation des données. Les résultats de cette étude démontrent bien l'efficacité de l'hydroxyde de calcium (Dycal) ou du fluorure de sodium (Duraflor) d'une part; et d'autre part l'efficacité accrue si on brunit la surface radiculaire en appliquant la solution médicamenteuse.

Conclusion

Le dentiste sera plus souvent confronté à des patients souffrant d'hypersensibilité dentinaire en raison de la plus longue

TABLEAU 3

Efficacité comparative du Dycal et du Duraflor

Temps (semaines)	Agents désensibilisants			
	Dycal, Ca(OH) ₂		Duraflor, NaF	
	nbre de sujets	efficacité (%)	nbre de sujets	efficacité (%)
0	140	100	104	100
1	140	93	104	89
2	140	94	95	95
3	100	97	80	88
6	90	97	71	87
13	88	97	68	90
26	140	94*	104	87*

* A $\alpha = 0,01$ Les % d'efficacité du Dycal et du Duraflor sont différents.

longivité des dents.

Les agents désensibilisants se divisent en deux groupes selon qu'ils sont à l'usage exclusif du dentiste ou qu'ils sont utilisés par le patient. Les agents utilisés par le patient sont les rince-bouche, gels fluorés et des dentifrices désensibilisants.

Plusieurs techniques et produits existent pour le traitement de l'hypersensibilité dentinaire. Toutes les techniques ne sont pas efficaces chez tous les patients probablement à cause de l'étiologie et des mécanismes d'action différents des substances employées. Le clinicien doit donc posséder plusieurs techniques pour une situation particulière chez un patient spécifique. Notre étude démontre l'efficacité de l'hydroxyde de calcium (Dycal) et du fluorure de sodium (Duraflor), en remarquant que l'hydroxyde de calcium a un effet plus durable.

Cependant, pour augmenter nos chances de réussite avec ces produits, il faut :

- faire un bon diagnostic;
- bien isoler et nettoyer le site à traiter;
- bien brunir le produit en place jusqu'à disparition de la douleur.

Le pH alcalin de l'hydroxyde de calcium peut irriter les tissus mous; ceux-ci peuvent être protégés avec un lubrifiant tel la vaseline.

Rappelons qu'un effet « placebo » accompagne très souvent le traitement de l'hypersensibilité dentinaire; Levin et al. (1973) démontre qu'un pourcentage pouvant aller jusqu'à 42% de sujets peuvent être soignés de façon très acceptable avec un « Placebo ». Cependant, nous ne reconnaissons pas l'eau stérile utilisée par Levin comme étant un parfait placebo.

Enfin, nous n'insistons jamais assez sur l'importance du brunissage recommandé par Hiatt et Johansen (1972) et qui explique la différence entre nos résultats et ceux de Levin (1973). Δ

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Announcements

NATIONAL HIGHLIGHTS

January 18, 1991
Dental Implants in the Restoration of Elementary as well as Comprehensively Involved Cases with Dr. Ralph A. Yuodelis
 Edmonton & District Dental Society
 (403) 434-2542

January 24-25, 1991
Advanced Restorative Techniques with Dr. Alvin J. Fillastre
 Calgary and District Dental Society
 (403) 228-7122

February 2-9, 1991
Update in Restorative Dentistry in Whistler, B.C.
 McGill and Dalhousie Universities
 (902) 494-1674

February 4, 1991
New Products and Materials with Dr. Gordon Christensen
 Edmonton & District Dental Society
 (403) 434-2542

March 13-16, 1991
B.C. Annual Dental Meeting
 B.C. College of Dental Surgeons
 (604) 736-3621

November/Novembre 1990

November 2-3: The Ontario Dental Association Symposium '90 — "Bridging the Gap", to be held in Toronto. For information contact: Professional Development, The Ontario Dental Association, 234 St. George Street, Toronto, Ontario, M5R 9Z9 or call the ODA at (416) 922-3900.

November 2-4: First National Congress of the Bulgarian Dental Association in Plovdiv, Bulgaria. For information, contact: Bulgarian Dental Association, 24 Veliko Tirnovo St., 4000 Plovdiv, Bulgaria.

November 6-9: The National Congress of the Israel Dental Association in Tel Aviv. For information, contact: Dental Congress 1990, c/o International Ltd., P.O. Box 29313, 65121 Tel Aviv, Israel.

November 16-18: Detroit Dental Review at the Hyatt Regency Dearborn. For more information, write the Detroit District Dental Society, 7430 Second Ave, Suite 420, Detroit, MI 48202 USA or call Marc Brown at (313) 871-3500.

November 19: TMJ Disorders — Differential Diagnosis, Treatment & Management by Dr. Terry Tanaka in Ottawa. Call: Ms. Bingham-McCrae at the Ottawa Dental Society at (613) 523-3876.

November 22: Toronto Academy of Dentistry, 53rd Annual Winter Clinic, Metropolitan Toronto Convention Centre, 255 Front St. W., Toronto, Ont. For information contact the Academy of Dentistry at (416) 967-5649.

November 23: 41st Annual General Meeting of the Ontario Public Health Assn in Scarborough. Contact: OPHA, 468 Queen St. E., Toronto, Ont. M5A 1T7 Tel.: (416) 367-3313.

January/Janvier 1991

January 13-18: 23rd International meeting of Federacion Oodontologica de Centro America y Panama (FOCAP) in Panama. FOCAP combines the membership of the 5000 members of dental societies in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama. Contact: Box 6777 Panama, 5 Panama. Tel.: (507) 64-3230.

January 17-20: Yankee Dental Congress Total Care Through Teamwork in Boston, MA. For more information, contact the Massachusetts Dental Society, 83 Speen St, Natick, MA 01760-4125 or call (508) 651-7511.

January 20-27, 1991: The Barbados Dental Association is hosting its Third Annual Dental Mid-Winter Convention plus Maxillofacial and Craniofacial Surgery Symposium. For further information contact: Alison Hoad (Mrs.), Travel Connection, 3rd Floor Cave Shepherd & Co. Ltd., Broad Street, Bridgetown, Barbados, Telephone: (809) 431-2060. Fax (E09) 431-2067.

January 26th-February 1: 26th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW. Tel.: 071-235-0788.

January 31-February 2: Miami Winter Meeting Committed to Progress at the Hyatt Regency, Miami. For additional information, contact the East Coast District Dental Society, 420 St. Dixie Highway, Suite 2E, Coral Gables, FL 33146 or call (305) 667-3647.

February/Février 1991

February 7-8: Academy of Dental Materials Contact: Dr. S.C. Bayne, Dept of Operative Dentistry, University of North Carolina, 7540 Brauer Hall, Chapel Hill, NC 27599-7450, USA.

February 15-16: American Prosthodontic Society Contact: Dr. H.J. Harvey, 919 N Michigan Ave, Suite 460, Chicago, IL 60611, USA.

February 16-23: Virgin Islands Dental Association Convention in St. Thomas. For convention pre-registration and group travel and accommodation, please contact: Dr. Bob Brandon, 85 Lonsdale Dr., London, Ont. N6G 1T4 or tel.: (519) 657-3368.

February 17-20: 126th Midwinter Meeting of the Chicago Dental Society. Cocontact: Chicago Dental Society, 401 Michigan Ave, Chicago, IL 60611, USA. Tel.: (312) 836-7300.

March/Mars 1991

March 1-8: American Board of Orthodontics. Contact: Dr. G.D. Selfridge, 225 S Meramec, Suite 310, St. Louis, MO 63105, USA.

March 17-21: 26th Australian Dental Congress in Adelaide, Australia. For more information, contact: National Congress Office, P.O. Box 29, Parkville, Victoria 3052, Australia.

March 27-28: Big Apple New York Dental Meeting. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, NY 10468, USA.

April/Avril 1991

April 6-13: 27th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW, England. Tel.: 071-235-0788.

April 17-21: American Association of Endodontists. Contact: Ms. I.S. Kudo, 211 E Chicago Ave, Suite 1501, Chicago, IL 60611, USA.

May/Mai 1991

May 2-5: American Academy of Cosmetic Dentistry in New Orleans. Contact: Ms. Barbara Jo Zoeller, 2709 Marshall Crt, Madison, WI 53705, USA.

May 9-12: American Dental Society of Anesthesiology. Contact: Mr. Peter Goulding, 211 E Chicago Ave, Suite 948, Chicago, IL 60611, USA.

May 12-15: American Association of Orthodontists. Contact: Ms. Audrey Schaper, 460 N Lindbergh Blvd, St. Louis, MO 63141, USA.

May 19-24: Academy of Denture Prosthetics. Contact: Dr. Charles Swoope, 1515 - 116th Ave NE, Suite 303, Bellevue, WA 98004, USA.

May 25-28: American Academy of Pediatric Dentistry in San Antonio, TX. Contact: Dr. J.A. Bogert, 211 E Chicago Ave, Suite 1036, Chicago, IL 60611, USA.

June/Juin 1991

June 5-8: Medical/Hospitech 91 in Bangkok, Thailand. For more information, contact: SHK International Services Ltd., 23/F, 151 Gloucester Rd., Wanchai, Hong Kong.

June 5-12: American Dental Hygienists Association. Contact: Ms. Kathy Gallagher, 444 N Michigan Ave, Suite 3400, Chicago, IL 60611, USA.

June 10-14: 2nd Iberian-Latin American Congress on Preventive Odontology & 2nd National Congress on Pediatric Odontology in Havana, Cuba. For more information, contact: Federacion Odontologica Latinoamericana, Calle 4, No. 407 entre y 19, Vedado, La Habana, Cuba.

June 14-17: The Third World Congress on Preventive Dentistry in Fukuoka, Japan. For information, contact: Secretariat of WCPD '81, c/o Dept. of Preventive Dentistry, Faculty of Dentistry, Kyushu University 61, Higashi-ku, Fukuoka, 812 JAPAN.

July/Juillet 1991

July 12-17: Academy of General Dentistry. Contact: Ms. Debbie Jepsen, 211 E Chicago Ave, Suite 1200, Chicago, IL 60611, USA.

September/Septembre 1991

September 27-30, 1991: 13th Congress of the International Association of Dentistry for Children, Kyoto, Japan. For information contact the Secretariat, 13th Congress of the International Association of Dentistry for Children, c/o Japan Convention Services, Inc., Sumitomo Seimei Midotsuji Bldg., 4-14-3, Nishitemma, Kita-ku, Osaka 530, Japan.

Offices and Practices

BRITISH COLUMBIA—Central Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work-week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472.

(08-03/13)

BRITISH COLUMBIA—Merrit: In the scenic south central interior, a 3-hour drive from Vancouver, and 1-hour drive from the Okanagan. A well-established, private family practice for sale, offering professional satisfaction and a sound investment opportunity. Computerized and recently renovated; independent evaluation available; opportunity to invest in dental building; will associate to ensure smooth transition. Ideal family community with excellent year-round recreation. Reply in confidence to CDA Box 2499.

(10-6/12)

BRITISH COLUMBIA—Victoria: well-established family practice for sale, located in a beautiful suburb of Victoria. Practice has a high gross-low overhead with a comfortable 4-day work week. Owner planning an early retirement for health reasons. This practice is located in the heart of some of the best fishing, sailing, golfing, and skiing in the world with a mild year-round climate. Please call: (604) 598-0809 or (604) 477-2565.

(09-19/11)

BRITISH COLUMBIA—Vancouver: Enjoy the great West Coast lifestyle! Very busy, growing family practice for sale. High gross, 28-hour work week, shared office for great net. 3 modern, equipped operatories, with ceiling tv's, Exan computer system for 5 years. Not inexpensive, but worth it! Serious calls only please. (604) 494-4304.

(08-05/13)

BRITISH COLUMBIA—Vancouver: Busy general practice for sale. Two-year-old office, 700 sq ft, two operatories, room for three, ceiling TV, Panelips, low overhead. Well-situated next to major tenant in shopping mall. Call Dr. P. Ng, office (604) 873-8117.

(10-1/10)

BRITISH COLUMBIA—Victoria: Well-established, high-quality family practice with good recall programme. Modern, well-equipped, three operatories, PAN. Located in professional building adjacent to major shopping centres. Beautiful Victoria is growing rapidly. Call (604) 721-0091 evenings.

(11-6/12)

BRITISH COLUMBIA—Victoria: This strategically located general practice is in a small strip shopping centre at the intersection of major traffic routes. High average gross with excellent growth potential in family area. Victoria is a "cosmopolitan town" with the best of ocean-side living. Please call (604) 538-6037.

(11-1/11)

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(06-08/13)

ALBERTA—Calgary: Dentist required to share space with solo practitioner in a private practice, downtown retail location. Excellent practice opportunity. For information call (403) 265-2929, or (403) 228-1719 (after 6 pm).

(11-7/11)

ALBERTA—Central: Thriving dental practice for sale. Population 13,000. Excellent four-operator office in modern building. Call (403) 672-3033.

(09-04/13)

ALBERTA—Edmonton: For sale. Busy, solo general practice in downtown area. Street level — excellent exposure, 2 operatories, practitioner returning to school. Exceptional gross income for 1989. High volume — active and new patients. Receptionist and assistant willing to stay on. \$150,000.00 FIRM Please reply to CDA Box 2496.

(09-21/10)

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(09-03/12)

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(09-18/10)

SASKATCHEWAN: For sale or associateship leading to purchase of excellent, very high gross family practice in medium-sized city. Six operatories with 4 x-rays and panelipse. Please call (306) 782-1528 after 5 p.m.

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(08-04/13)

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(08-09/13)

MANITOBA—Winnipeg: Ultra-modern two-year-old dental practice in prime strip mall for sale. Excellent exposure, growing practice with new A-DEC equipment, great potential. Owner has accepted federal government contract. Contact business manager at (204) 832-0578 or write to 125 Sunnyside Blvd., Winnipeg, Manitoba R3J 3M1.

(10-2/11)

ONTARIO—Etobicoke: FOR SALE. long-established solo dental practice, very busy. Excellent opportunity for the right person. Owner is retiring. Please call (416) 845-3114.

(07-04/10)

ONTARIO—Ottawa Valley: Family practice for sale. Established 23 years. Owner retiring — will associate. Hospital privileges, low overhead, no assignment,

low receivables. Excellent recreation. Two operatories, 900 sq ft — air conditioning. Reply to CDA Box 2498.

(09-17/10)

NEW BRUNSWICK—Bathurst: Busy, established family practice for sale. Newly renovated office. 30 new patients per month with strong recall base. Owner leaving area and willing to negotiate price. Reply in confidence to CDA Box 2500.

(07-14/13)

QUEBEC—Montreal: Dental clinic and laboratory for sale. Two operatories. Private parking with or without building. Front metro. Good gross. Latin, Spanish, English, French, Greek, etc. clientele. Owner may stay to introduce buyer. Please reply to CDA Box 2494.

(07-18/11)

Associateships Available

BRITISH COLUMBIA—Victoria: One of Canada's most beautiful cities. Associate required to take over existing case load and share new patients (approx. 140/month) in our total care, progressive practice. Large modern office currently has 3 dentists. Potential future partnership. Dr. Donald Bays Call collect (604) 381-6433 (w) or 595-8050 (h).

(09-05/11)

ALBERTA—Calgary: Excellent opportunity to associate in a group practice with 5 dentists and a part-time orthodontist. We are looking for a self-motivated, skilled and caring clinician with an outgoing personality. Our location is one of Calgary's fastest growing suburbs with a strong patient base and lots of potential for growth. The office has been professionally designed; all operatories have natural light and are fully-equipped with P&C chairs, A-DEC carts, Kabo handpieces and x-ray. We are up-to-date with all phases of dentistry, sterilization and asepsis. In house lab for prosthetics and splits; C & B lab across the hall. Dentists and assistants perform all hygiene services. We have a topnotch computer system and an efficient staff to monitor production and collection. Reply in confidence to Dr. Dan Goldstein (403) 240-1023.

(10-7/13)

ONTARIO—London: Associateship with opportunity for future partnership in a growing group practice. Six operatories, state-of-the-art facilities — only two years old. Located at Commissioner's Court Plaza, a high gross area. (519) 294-0151 ask for Lia.

(11-3/13)

ONTARIO—Ottawa: Full-time associate required for busy, progressive office. Flexible hours, modern, family, preventative practice. Pleasant atmosphere, open concept. Located in Orleans, beautiful suburb of Ottawa. Please call (613) 824-7288.

(09-12/11)

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(09-15/13)

ONTARIO—Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent opportunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq. ft. Modern facilities in professional walk-in medical-dental. Positions available June 1990. Call: (416) 452-7111.

(08-07/13)

ONTARIO—Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60% associate percentage offered. Call (705) 522-4252.

(08-01/13)

ONTARIO—Woodstock: The Nix Team requires a full/part-time associate for our progressive dental office in Woodstock. We offer a new, state-of-the-art facility and the newest equipment. We focus on warmth, caring and expert communication with our patients. We value preventative and quality restorative dentistry. Please phone Dr. Garry Nix, (519) 539-9161, ask for Sheila.

(10-9/11)

ONTARIO—North Toronto: Position available immediately or a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426.

(08-06/13)

QUEBEC: Bilingual periodontist looking for a part-time associateship in a periodontal practice in the Montréal or South Shore area. Two nights a week or Saturdays. For more information, contact Dr. C.D. Alleyn. Phone home (514) 347-4724 or work (514) 358-7274.

(09-08/10)

Auxiliaries

ONTARIO—Woodstock: The Nix Team requires a dental hygienist (expanded duty would be welcome) for our progressive office. We value preventative and quality restorative dentistry. Our team offers relocation expenses. We emphasize personal development through continuing education and full participation with other members of our team. Please send resume to: Dr. Garry Nix, 112 Springbank Ave., Woodstock, Ont. N4S 4Y3. ATTN.: Sheila.

(10-10/11)

Opportunities Available

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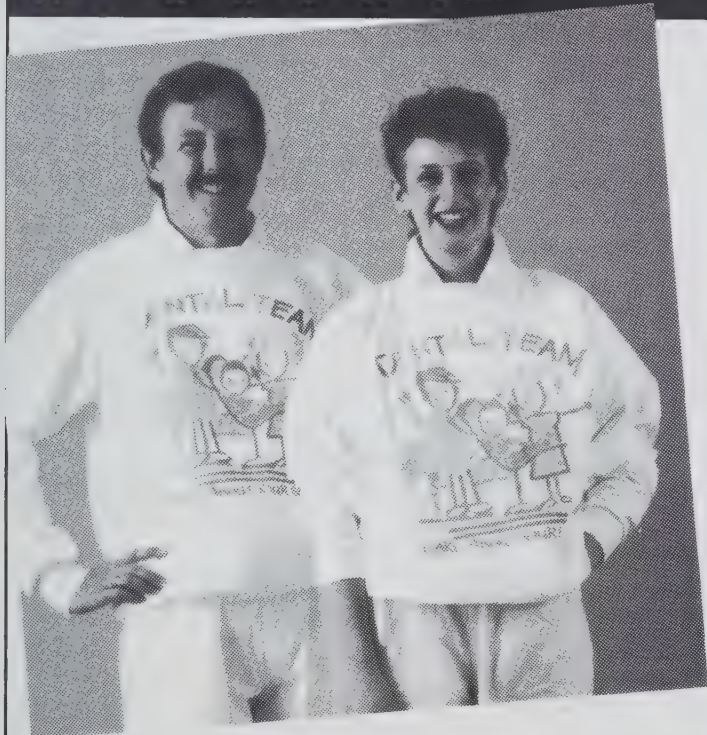
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There's a certain irony in some of the issues before the profession these days. Prodigious amounts of new knowledge are being acquired and disseminated. Continuing improvement in technology results in ever-increasingly rapid distribution of information. The media is being recognized as a force to be respected and kept informed of dental innovation. In this, the Age of Information Overload, communication has emerged as the key to societal satisfaction. Somehow, however, communication — the ability to transmit a message from one party to another — continues to plague the dental profession. (While this is hardly a problem restricted to our brethren, its ramifications in the breakdown between government and the populace or any other equally distressing blockade are far too philosophic for this humble commentary.) We don't seem to be talking to anybody properly. Whether it be a lack of professional dialogue with the patient or inappropriate requests for specialist consultation, dentists seem to have forgotten the importance and essence of information exchange.

Consumers have the right to be informed. Health practitioners are as obligated as any other to inform the patient of the risk involved in any proposed treatment. Whether a signed consent form is morally adequate remains a dilemma for each practitioner to face. I continue to be one of an increasingly diminishing group who believes that a signed consent form creates more problems than it alleviates. Until such time as the lawyers of this country can create an appropriate document that not only satisfies the information transfer between patient and professional but, more importantly, reflects the spirit of that exchange, the consent form will remain a tool, effectively wielded by whichever side chooses to use it first in a legal confrontation. Regardless of one's convictions, however, an appallingly large number of lawsuits and investigative complaints seem to reflect insufficient patient-practitioner dialogue.

In my own practice, I am continually amazed at the number of patients referred to me, who have nary an inkling of the purpose of their visit. Attempting to reconstruct the discussions with their dentists that preceded their arrival on my doorstep can be arduous. That is not to say that many patients don't suffer severe episodes of selective memory loss. In a disconcerting number of instances, alternative treatment plans have not been discussed. I can only assume, unfortunately, that this oversight is the result of treating the insurance plan coverage rather than the patient's problem.

Now we seem to be embarking on the next step in potential communication breakdown: the use of electronic media to transfer data to the insurance industry. Let me first state that while I am not against the concept of EDI (Electronic Data Interchange), I have not been assured that this modality will not increase the likelihood of fraudulent claims nor increase the participation in direct assignment and all the constraints that pathway would ultimately create. "Wire Service," however, without any exchange of money or bills between the patient and dentist, does not encourage open discussion between the participants. Like it or not, the anticipation of paying out money is the most effective means of eliciting questions from most patients.

Spending a few minutes talking to your patient may prevent a lawsuit. A patient impressed with your genial presentation of a proposed treatment plan becomes a likely referral source. A properly prepared specialist referral reflects your office's professionalism — and is duly noted by the referred patient. Declining use of interpersonal communication skills is proving to be dangerous to the health of your practice. Applied liberally, skilled communication can lead to a vital, satisfying professional experience.

*Jack Gryfe, DDS, FRCD(C)
Oral and Maxillofacial Surgeon
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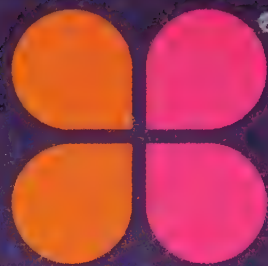
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1. Strep mutans. Action of material is limited to time of placement with no residual or long-term effects. 2. Branstrom, M., Communication Between the Oral Cavity and the Dental Pulp Associated with Restorative Treatment, *Operative Dentistry*, 1984. 3. Scherer, W., D.D.S.; Cooper, H., D.D.S.; Antonelli, J., D.D.S., Antimicrobial Properties of Dental Adhesives, *Journal of Esthetic Dentistry*, September/October, 1990. 4. Wayne W. Barkmeier, D.D.S., M.S., report on file.

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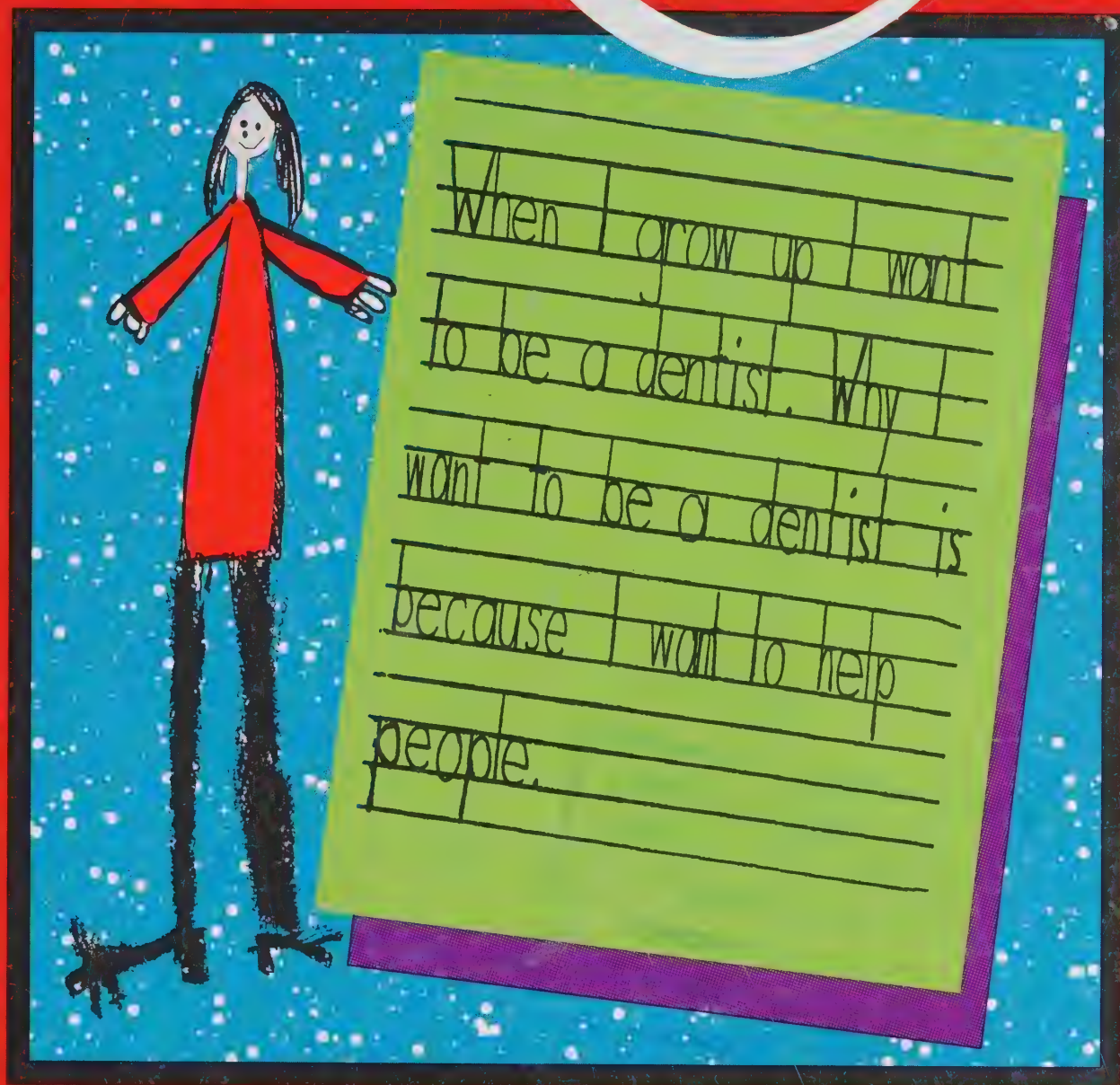
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CDA MISSION STATEMENT

The Canadian Dental Association serves the dental profession — and through the profession the Canadian public — as the authoritative national voice and resource for dentists.

In cooperation with the provincial dental associations and affiliated organizations, CDA offers services, in both official languages, intended to support and advise all areas of dentistry and to represent, protect, promote and develop the interests of the dentist as ethical practitioner, professional, educator, student, researcher, business person, citizen and individual.

CDA recognizes a particular responsibility to contribute to the development of national positions and standards related to dentistry, dental education, dental research, dental equipment, dental materials and dental personnel.

CDA is dedicated to the principle that all Canadians should have the best oral health care it is possible to provide; it actively seeks input from and dialogue with governments, consumers and all interested in dentistry to enable it to serve more effectively both its members and the Canadian public.

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December 1990

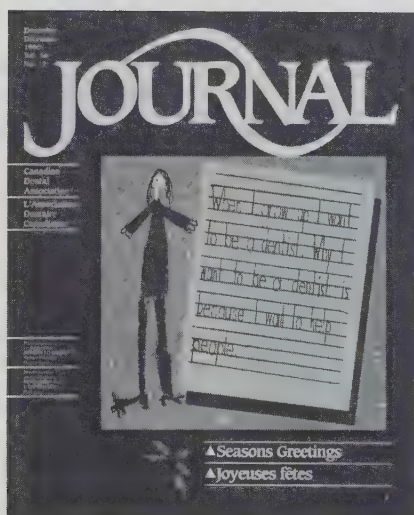
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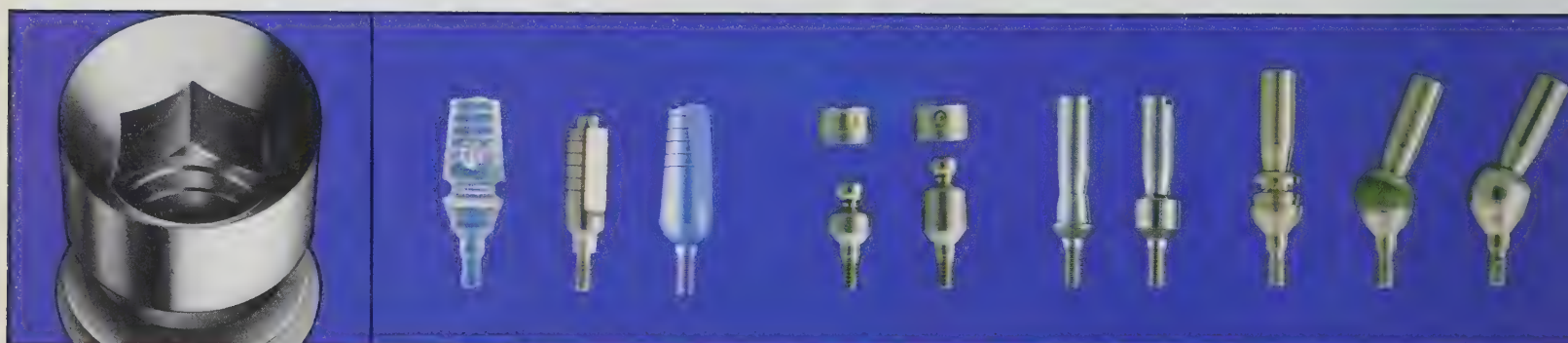
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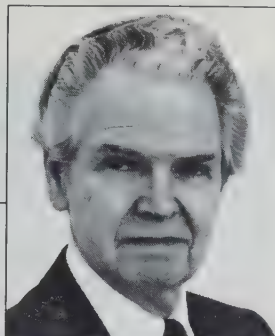
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Helping People

A delightful story crossed the Editor's desk last month. About 20 years ago, a primary school teacher asked her pupils that familiar question, "What do you want to be when you grow up?" To make the lesson more interesting, the pupils were asked to draw a picture of what they might look like as a "grown-up".

One little girl very carefully printed, "When I grow up I want to be a dentist. Why I want to be a dentist is because I want to help people". Accompanying the precise lettering was an imprecise drawing depicting her future vocation. As repeated in thousands of homes every day, the little girl proudly and carefully carried her "art" home. Only this time it didn't find just a spot on the fridge, it almost covered the entire door.

This time of year is dichotomous. Part of the world resounds with joy: "peace on earth, goodwill to all men". There are expressions of love; gift buying and gift giving borders on the frenetic. Food and drink is consumed in immense quantities. The intensity of conviviality and kinship influences untold numbers.

Other parts of the world have no joy. Their days are portioned between famine and starvation. There are no gifts, often only bullets and bombs. Rather than kinship there is suspicion; survival replaces camaraderie.

The simple message of a six-year-old child — "I want to help people" — encapsulates everything inherent in a Christmas carol, a Hanukkah Dedication, or the invocations of any other religion known to civilization. Increased adherence to a child's reasoning could do more to dissipate the dichotomy between the "haves and have-nots" than most political forces at work today.

Consider dentistry a microcosm of the entire world. If students entered dental faculties, . . . if graduates joined the profession, . . . and if dentists treated patients with the prevailing thought, "I want to help people", one can only speculate on the change such a philosophy would have on the dental profession, and by extension, the world. The transfer of benefits from the well-being of the individual to that of others has always been astonishing.

Oh, and what became of the little girl. Well she didn't become a dentist but she is a professional in the health-care field. She spends her days tending to the needs of the disadvantaged, the ill, and the lonely — "because I want to help people".

P.R. Crawford, BA, DMD

Editor: Journal of the Canadian Dental Association.

The Journal staff; Linda, Ralph, Louise, Cynthia and Jennifer, join in sincerely wishing our readers everywhere joy and fulfillment during this holiday season.



A Celebration of Human Values

The month of December is synonymous with rejoicing. Many family gatherings take place during this period. People try to get closer, which is something that seems more and more difficult nowadays. People are more tense, they have difficulty with their interpersonal relationships. As dentists, we should be experts in the field of interpersonal relations.

When I am asked to define dentistry, I consider interpersonal relationships to form 80% of the definition. Maybe purists will take offence here; they would say, 'shouldn't scientific knowledge and new technologies be the main element of the answer?' I don't think so. Even if someone was given all the education available and applied all techniques to perfection, if he/she cannot put him/herself at the patients' level, put them at ease and tell them what he/she knows, he/she cannot be considered a good practitioner.

In a world where communications occupy a significant place in our daily lives, dentistry must recognize its importance and value. I don't want to minimize the fact that it is crucial to be abreast of current knowledge; I only want to emphasize the human values we should attach to the practice of dentistry.

Between you and me, our patients cannot assess our technical work, but they can assess our attitude towards them. If we want to keep having a positive impact on their dental health, we have to raise our communication standards. Today, people are increasingly concerned about the management style in our offices. We are small businesses. To be efficient and profitable, we must take care of all aspects of our practice. Communications is still unfortunately a weakness in many of our offices.

We think we are experts for having taken a few management courses and for having high tech offices with computers and a large personnel. It's not always the case. We must get closer to our patients, and to do so, we must be at ease with ourselves.

Let us then view the holiday season as an opportune time to celebrate human values with family and friends. May this season be one of blessings and peace. Merry Christmas and Season's Greetings!

*Gilles Dubé, DMD, MSc, Admin. Santé
President of the Canadian Dental Association*

Esteemed Senior Officer Made Honorary Lieutenant-Colonel. . .

CFDE Creates Major Charlie Hunt Endowment Fund in Recognition

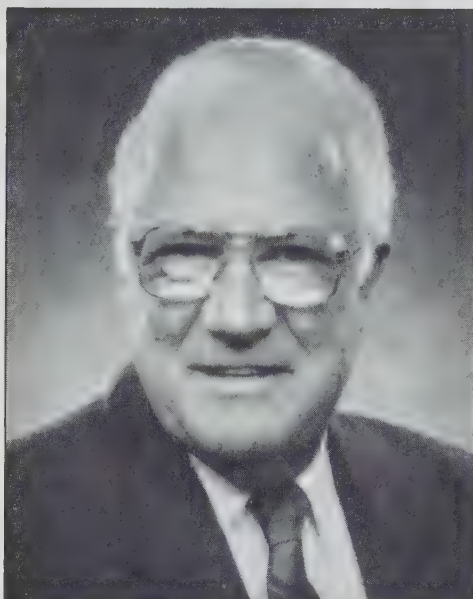
Chief of the Defense Staff, General John de Chastelain, has appointed Major (Retired) Charles Hunt, CD of Markham, Ontario, Honorary Lieutenant-Colonel of the Dental Reserves as of 1 September 1990. Lieutenant-Colonel Hunt is the first person to be granted this title.

The position of Honorary Lieutenant-Colonel is a three-year appointment, made by the Minister of National Defense to a retired senior officer or prominent civilian on the recommendation of the Chief of the Defense Staff.

In a career spanning 26 years, Lieutenant-Colonel Hunt held various staff positions during WW II with the Canadian Dental Corps in Canada, England, France, Belgium, and Holland. Following the war, he served with '54 Dental Unit, Militia' in Ottawa until 1965. He has been President of the Royal Canadian Dental Corps Association since 1978.

Lieutenant-Colonel Hunt has been associated with the civilian dental supply business for many years and is a former Vice President of *Ash Temple Limited* and a former General Manager of *Premier Dental (Canada)*.

In recognition of his contribution to dentistry, the Canadian Dental Association, through the CFDE, has established an endowment fund in his name to promote dental education and research in Canada. The CFDE fund, known as the "Major (Ret'd) Charlie Hunt Endowment



Charles Hunt, CD

Fund", was announced at the RCDC/CFDS 75th Anniversary Dinner held last August. The audience there was told that the Fund will encourage support for the CFDE from past and current members of the military community. The news was met with thunderous applause, a tribute both to Major Hunt and the Fund his dedication to dentistry inspired.

The CFDE welcomes all contributions to the Fund. Write: CFDE, Charlie Hunt Fund, 1815 Alta Vista, Ottawa, K1G 3Y6.

Lieutenant-Colonel Hunt resides with his wife, Maureen, in Markham, Ontario. Δ

Canadian Forces Dental Services Members Among First to Arrive in Gulf 'Action'

The deployment of Canadian Forces military personnel to the Persian Gulf has not been limited to sailors and pilots. Four members of the Canadian Forces Dental Services were among the first to arrive in this theatre of operations. Major Paul Demers of Halifax, Nova Scotia, an oral and maxillo-facial surgeon, and Corporal Kim Smallman of Borden, Ontario, a dental assistant specializing in operating room procedures, are among a group of nine medical/dental specialists serving in the Gulf aboard the U.S. Navy hospital ship *Mercy*. Captain Margaret Cupples, a dental officer from Halifax, and Sergeant Chris Simpson, a dental hygienist from P.E.I., are aboard HMCS *Protecteur*, as part of the three-ship naval task group. This is the first time women dental personnel have been called to a potential war zone.

Further involvement of Canadian military dental personnel is anticipated to coincide with the decision to commit a squadron of CF 18 fighter jets to the Gulf area. Δ



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Dental Officers Graduate at CFB Borden

The graduation ceremonies of the Dental Officer Training Plan (DOTP) Phase III Course candidates were held at Canadian Forces Base Borden in August. Brigadier-General J.F. Begin, Director General of Dental Services, served as Reviewing Officer for the parade. Other distinguished guests present for the occasion were: Brigadier-General (Retired) and a Past-President of the CDA, Dr. W.R. Thompson, Dr. K. Roach, current Past-President of the CDA, and Capt. (Retired) W. MacKenzie, Secretary of the Royal Canadian Dental Corps Association. The host of the event was Lieutenant-Colonel J.J. Lemieux, Commandant of CFDSS.

Brigadier-General Begin presented the Honour Candidate Trophy to Second Lt. P.J. Helpard of McGill University (photo right). The Field Exercise Trophy was won by Second Lt. M. Caminiti of McGill University (photo left).

One of the highlights of the graduation ceremonies was an address by current Past-President of the CDA, Dr. Kevin Roach to the graduating candidates during the mess dinner.

DOTP is a Canadian Forces program which subsidizes entry students' educational and living expenses, and employs graduates in CF dental clinics for three or four years of obligatory service. In their third or fourth year of dental school, they are familiarized with the administrative and management procedures of CFDS and given exposure to 'field environments', or mobile field dental clinics. △

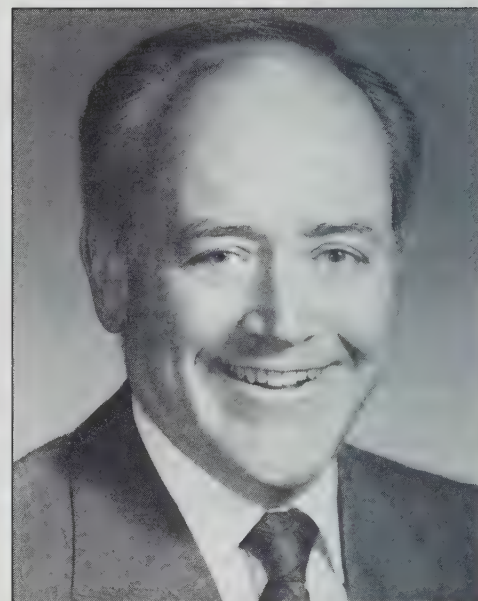


Brigadier-General J.F. Begin presenting the Field Exercise Trophy to Second Lieutenant M. Caminiti of McGill University.



Brigadier-General J.F. Begin presenting the Honour Candidate Trophy to Second Lieutenant P.J. Helpard of McGill University.

Orthodontists' Award Highest Honour



Dr. Robert N. Hicks

Dr. Robert N. Hicks was presented with the Canadian Association of Orthodontists' Distinguished Service Award at their Annual Meeting held in Vancouver, August 23-25, 1990. This is the highest honour that the Canadian Association of Orthodontists can bestow on its members. It is awarded in recognition and appreciation of outstanding contributions and exemplary distinguished service rendered for the benefit and advancement of the orthodontic profession.

Dr. Hicks received his dental degree from the University of Alberta in 1962 and his MSc degree and Certification in Orthodontics from Northwestern University in Chicago in 1967. He is Past-President of the Canadian Dental Association and was awarded CDA's highest honour, Honourary Membership in 1989. Dr. Hicks is well known to dentists throughout Canada for his outstanding contribution to CDA's Taxation Committee. △

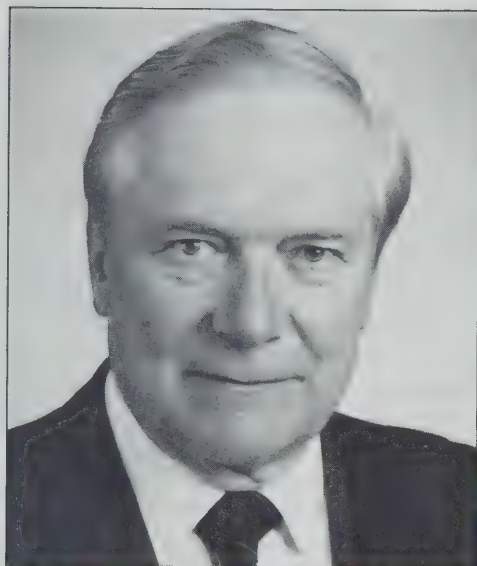
Did you know?

It's About the Government

"Government is founded on the authority, and is instituted for the benefit, of a people; when, therefore, any government long and systematically ceases to answer the great ends of its foundation the people have a natural right given to them by the Creator to seek after and establish such institutions as will yield the greatest quantity of happiness to the greatest number."

"Toronto Reformers", Declaration of August 1837

Canadian Academy of Prosthodontics Elects New President



Dr. Carl Osadetz

At the Annual Scientific Meeting of the Canadian Academy of Prosthodontics, Dr. Carl Osadetz of Edmonton, Alberta was elected President for the term 1990-91. He is currently a Professor and Chairman of the Division of General Practice at the University of Alberta. He has held the position of Acting Chairman of the Division of Fixed Prosthodontics and has been the Director of Clinics. Prior to accepting his appointment at the University of Alberta he was a member of the Department of Restorative Dentistry at the University of Toronto. He received his Master of Education degree from Brock University in St. Catharines, Ontario.

He is a Fellow of the Academy of Dentistry International and a member of the Canadian as well as the International Associations for Dental Research. He has served as the Alberta representative to the Association of Canadian Faculties of Dentistry (ACFD/AFDC) and has been an examiner for the National Dental Examining Board of Canada. He and his wife Elsie have raised three sons. △

Record Attendance Canadian Academy of Prosthodontics Annual Meeting

The 1990 meeting of Canadian Academy of Prosthodontics in Vancouver surpassed the registration of any former meetings. This record attendance was due to the excellent clinical program arranged by Dr. Dennis Nimchuk. Dr. Nimchuk was ably assisted by Dr. Harry Gelfant in providing clinicians of international renown such as:

Dr. Sumiya Hobo, Tokyo, Japan
Dr. Harold W. Preiskel, London, England
Dr. Raymond L. Bertolotti, California, U.S.A.
Dr. John A. Sorensen, California, U.S.A.

Other members of Dr. Nimchuk's Vancouver committee who contributed their

efforts towards making both the Scientific and Social Programs a success were: Drs. Graham Matheson, Wayne Halstrom, Arthur Ross, Mel Sawyer, Dominic Ciarnello and Ivan Gasoi.

At the presentation luncheon, Dr. Osadetz addressed some of the issues facing the Academy in the coming year. He invited the active involvement of all members to support the C.A.P. organization in its dedication to promote excellence in the practice of Prosthodontics. The Canadian Academy of Prosthodontics is a group affiliate of the Canadian Dental Association and administers the Lorne McLaughlin fund which supports worthy Prosthodontic projects. △



Dr. David H. Charles (on the left) receiving the Past-President's award of recognition from Dr. Alan R. Mills, Secretary Treasurer of the Canadian Academy of Prosthodontics.

Canadian Academy of Oral Medicine

A Canadian Academy of Oral Medicine has recently been established.

There had been a similar Academy some 18 years ago but it amalgamated with the Academy of Oral Pathology. Today, with increasing emphasis in Oral Medicine on the teaching and practice of dentistry, and the increasing number of professionals involved in the discipline — about 50 in Canada — reconstitution of the Academy presents many advantages. Similar academies exist in the United States and the United Kingdom.

Its mandate is to promote education, research and clinical practice in Oral Medicine. The Academy presently has thirty-eight members and the following members are serving as officers:

President

Dr. Ralph Brooke
Faculty of Dentistry
University of Western Ontario
London, Ontario
N6A 5C1

Vice-President

Dr. Joel Epstein
Cancer Control Agency of B.C.
600 West 10th Avenue
Vancouver, B.C.
V5Z 4E6

Secretary

Dr. Bruce Blasberg
Department of OMSS
Faculty of Dentistry
2199 Wesbrook Mall
Vancouver, B.C. V6T 1Z7

Treasurer

Dr. Monique Michaud
Section of Oral Diagnosis
Faculté de Médecine Dentaire
Université de Montréal
Case Postale 6128
Succursale "A"
Montréal, Québec H3C 3J7

Readers wanting more information or membership application can contact:
Dr. Bruce Blasberg, Secretary, Canadian Academy of Oral Medicine, Faculty of Dentistry, University of British Columbia, 2199 Wesbrook Mall, Vancouver, B.C. V6T 1Z7. Δ

\$778,000 for Care, Treatment and Support Initiatives

The Honourable Perrin Beatty, Minister of National Health and Welfare, today announced that \$778,139 has been awarded to three organizations for projects to support the quality of health and social services available to persons living with HIV infection and AIDS, one of the key goals of *Building an Effective Partnership: The Federal Government's Commitment to Fighting AIDS*.

The Canadian Hemophilia Society will receive \$400,000 to provide on-going prevention and control of HIV infection and AIDS, as well as support services to hemophiliac families and their caregivers.

The Canadian Hospital Association will receive \$292,250 to develop a program model demonstrating the economic benefits of a team-based management education program for caregivers of AIDS/HIV patients in health care institutions.

The AIDS Network of Edmonton Society will receive \$85,889 to expand the HIV/AIDS counselling network in the Province of Alberta. In addition, it will hire a community consultant to provide a continuing professional education approach.

"The delivery of health and social services must be effective and sensitive to the needs of persons living with HIV and AIDS. As well, we must be more attentive to the support provided by their caregivers, families and friends. This assistance and support are fundamental goals of the federal government's AIDS strategy," said the Minister.

For more information contact:
Ottawa: Monette Haché

Federal Centre for AIDS
Health and Welfare Canada
(613) 954-5151 Δ

Additional \$100,000 to 10 National Voluntary Health Organizations

The Honourable Perrin Beatty, Minister of National Health and Welfare, today announced the approval of \$100,000 special funding to 10 national voluntary

health organizations, in response to a recommendation from the National Voluntary Health Organization Review Committee, composed of representatives from the voluntary sector.

"It is estimated that one Canadian in four volunteers for activities related to education, health and social development," explained Mr. Beatty. "The assistance provided today will serve to establish specific planning or training activities and thus strengthen the national infrastructure of the organizations involved."

The national organizations involved provide support services to their affiliated provincial and local groups, such as assistance with program planning and delivery, chapter development, volunteer training, financial planning, public education, and fund raising.

The special funds of \$10,000 to each organization will be utilized in such areas as human and financial resource development, design of a long-range plan, services to chapters, and the establishment of active affiliates in previously unserved areas.

"The importance of volunteers in the delivery of health services and in fund-raising cannot be overstated," the Minister said. "It is through this important partnership between the voluntary sector and the government that Canadians will continue to have access to quality information, programs and services and can participate in decisions affecting their own health."

In June, 1990 the Minister announced the list of 49 national voluntary health organizations that received funding from the \$2.9 million Sustaining Grants Program.

The following organizations are to receive the special funding.

Allergy Information Association
DES Action Canada
Canadian Neurological Coalition
Canadian Association for Narcolepsy
Canadian Friends of Schizophrenics
Canadian Foundation for the Study of Infant Deaths
La Leche League Canada
Canadian Rett Syndrome Association
Canadian Association of Health Care Auxiliaries

Canadian Psoriasis Foundation

For more information contact:

Karl H. Benne
Health and Welfare Canada
(613) 954-8638 Δ

Quebec 1991: Convention Update

Gearing up for Quebec



As you know, Quebec City will play host to the 1991 Canadian Dental Association's Annual Convention and once again, convention registration for CDA members is FREE! Non-members will be charged \$145.00 which includes access to the 2 1/2-day convention proper, the exhibit hall and admission to the Opening Ceremony on request.

The time to plan your participation is NOW. The 1991 convention team has already begun to create another fantastic scientific program and round up exhibitors to fill the Quebec City Convention Center. Numerous dental specialty groups are also planning to bring their membership to Quebec City next August and CDA Conventions extends a special invitation to all its dental colleagues. Providing you're a member of CDA, it'll cost little more than time to extend your stay in Quebec and participate in the 1991 CDA Convention.

Many internationally renowned speakers and first-class clinicians are scheduled to deliver presentations during the Quebec convention, including Dr. Gordon Christensen of Provo, Utah. Details regarding the sessions to be offered will be conveyed through the *CDA Journal* as they become available, but in the interim, why not take a few minutes to discover the attractions that await you within the walls of the only fortified city north of Mexico....

It's a little bit of Europe in our own backyard, the cradle of French civilization on the North American continent - it is the delightful city of Quebec City to which I am now referring, where charm teams with comfort to welcome you.

The Bonhomme may not be around in August to greet you but you can rest assured that the spirit he represents lingers in Quebec year-round. From the first snowfall to the last melting icicle, visitors from across the nation and around the world are welcomed.

Quebec is one of Canada's only major cities to attract world interest. It is the first North American city to be included on UNESCO's prestigious World Heritage list along side such monuments as the Pyramids of Gizeh, the Statue of Liberty, Rome and Jerusalem.

The Quebec City Convention Center will be the focal point for the 1991 CDA Convention and amongst convention hotels will be the Hilton International, Hotel des Gouverneurs, the Château Frontenac and the Loews Le Concorde establishments.

Quebec City and the CDA Annual Convention - August 24-28 - make plans to come and see for yourself just what it is that makes this experience one you can't afford to miss.

Michel Jahjah, D.D.S.
General Chairman
CDA Conventions



The Bonhomme may not be around in August to welcome you, but the spirit he represents lingers in Quebec year-round.
(Industry, Science and Technology Canada photo)



The writing's on the wall - MAKE PLANS TO BE THERE!
(Industry, Science and Technology Canada photo)

FDI

● MILAN 1991 ●

OCTOBER 7 – 13, 1991

Let CDA Conventions and TourCan take you there ...

CDA Conventions will once again be arranging special tour packages for members wishing to attend the 1991 FDI Congress in Milan, Italy. Judging by the response to our initial efforts in this sphere – it seems that it is a service that is valued and appreciated by CDA's membership.

Furthermore, our efforts resulted in a significant increase in Canadian representation at this international event. There were 185 Canadian dentists at the Singapore Congress which was held last September – only 8 other countries surpassed this total! (Japan – 474, Sweden – 463, Singapore – 324, Finland – 298, Australia – 294, United States – 265, Germany – 240, Malaysia – 191).

TourCan Incorporated, a Toronto-based travel agency, has once again been appointed as the Canadian Dental Association's sole sponsor and official travel agent for the



FDI Congress. In conjunction with CDA Conventions, TourCan is currently developing unique tour programs utilizing two world class airlines. Congress delegates will have an opportunity to select one of several side trips. Potential destinations may include Greece, Turkey, Egypt and continental Europe.

In 1990, TourCan organized a tour through India and another which brought participants to Seoul (Korea), Hong Kong and Bangkok. The two photos on this page illustrate CDA members and their spouses, accompanying persons and friends enjoying a highlight during two of several tours offered in conjunction with the 1990 FDI Singapore Congress.

**You will be receiving more details about the 1991 Milan Congress tours in the near future.
In the meantime, call CDA Conventions (613) 523-1770 for more information.**

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it guarantees my privacy and my security."

Dr. Douglas Pauls
Vancouver, B.C.

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That means payment will be made *fast*.

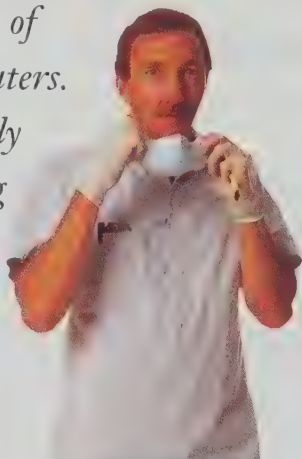
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one button. It means a system that's so easy anyone can use it with minimal training. It means no more claim form, no more postage, and no more paper chase. It's that simple.

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Dr. Glenn Baron
Edmonton, Alberta



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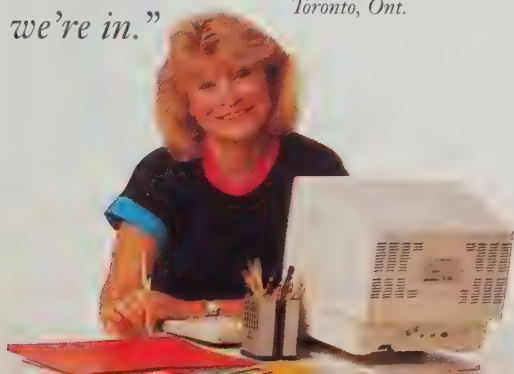
Dr. Gary MacDonald
Executive Director
Newfoundland
Dental Association

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Ms. Penny Day
Dental Office Manager
Toronto, Ont.



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- A clinical study showed that alginate (Jeltrate Type II, Regular; Caulk) impressions stored in wet paper towels in a sealed plastic bag gave models that provided clinically acceptable orthodontic retainers even after 72 hours storage.

Douglass, J.B. et al. *Am J Orthod Dentofac Orthop* 97:93-97, 1990.

- Dycal (Caulk) and visible-light cured VLC Dycal were tested against *S. Mutans*, *A. viscosus*, *S. aureus* and *K. pneumoniae*. Dycal demonstrated long lasting germicidal properties for all bacteria. VLC Dycal demonstrated little initial and no germicidal effect after 72 hours.

Meeker, H.G. *Gen Dent* 38:121-124, 1990.

- Contact of dental hygiene instruments (Cavitron, Dentsply; Sonic Scaler, Star; hand scaler, Hu Friedy) with enamel-composite margins resulted in increased microleakage.

Arcoria, C.L. et al. *Gen Dent* 38:129-131, 1990.

- The AGD membership survey indicated that 81% of dentists, 58% of hygienists and 56% of assistants have received hepatitis B vaccination. The AADS recommends that it be administered during the training stages for dentists and auxiliary personnel.

Gen Dent 38:178-179, 1990.

- Various techniques were used to repair bars of Valiant Ph.D. amalgam. Mean flexural strengths of repairs ranged from 22 to 31% of the unrepaired controls. Pretreatment with a mercury-rich mix did not improve the strength. Repaired junctions should not be relied upon to retain the amalgam.

Erkes, E.O. et al. *Gen Dent* 38:203-205, 1990.

- Express (3M), Extrude (Kerr), President (Coltene), and Reprosil (Caulk) light-bodied polysiloxane impression materials were tested for compatibility with 11 die stones. All combinations reproduced the 20 µm line ADA standard. Greater accuracy could be achieved with some combinations.

Omana, H. et al. *Oper Dent* 15:82-85, 1990.

Special thanks to **THE DENTALETTER**, June, 1989.

Providing about 25 concise summaries in each eight page issue THE DENTALETTER

keeps dentists' clinical knowledge up to the minute with only a 1/2 hour of reading per month. For subscription information contact 133 Richmond St. W., Toronto M5H 3M8, telephone (416) 869-1777.

Did you know?

Last of Original Patients Re-visits Site of Insulin Discovery

One of the world's first diabetics to receive insulin therapy attended the opening of the new Insulin Exhibit at the University of Toronto on U of T Day, October 13.

Ted Ryder, 74, of Farmington, Connecticut is the last remaining survivor of the original patients treated by Frederick Banting and Charles Best, the U of T scientists who discovered insulin.

With Ryder in attendance, U of T President Robert Prichard opened the exhibit and dedicated the university's Medical Sciences Auditorium to J.J.R. Macleod, the director of the laboratory where Banting, Best, and James Collip conducted experiments that led to the development of insulin therapy.

The new exhibit retells the story of the discovery of insulin with photos, historical documents, letters, and newspaper clippings. A second part describes current diabetes research.

In 1922, the team of Banting, Best, Collip and Macleod were able to announce their discovery of the insulin hormone. Pancreatic extracts made in their laboratory were successful in treating the debilitating symptoms of diabetes.

Their achievement earned them the 1923 Nobel Prize for Medicine. A cast of the Nobel medal is featured in the exhibit.

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Unit values: (Funds are valued weekly)

Fund	Unit values as at	
	October 31, 1990	September 30, 1990
Bond & Mortgage Fund	75.18605	73.50127
Common Stock Fund	14.95232	15.06013
Money Market Fund	52.83538	52.27442
Balanced Fund	28.96432	28.77824

G.I.C. Fund

Term

	*Interest rates as at	
	October 31, 1990	September 30, 1990
1 yr	11.80%	11.80%
2 yr	11.45%	11.45%
3 yr	11.35%	11.45%
4 yr	11.30%	11.35%
5 yr	11.30%	11.35%

(*rates subject to change without notice.)

Total Assets (Market value) of the Plan as of:

October 31, 1990	September 30, 1990
\$123,605,329.15	\$122,932,238.60

For further information:



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CDSPI

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Suite 600
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Willowdale, Ontario
M2J 4Z3

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only 1-800-268-5418
Quebec and Ontario, (except Area
Code 807) 1-800-268-3411
Metro Toronto Area 497-7117

Obituaries/Nécrologie

Bretzler, G.D.: Dr. Bretzler passed away September 13, 1990. He graduated in 1967 from the University of Toronto.

Gelmon, Abraham: A graduate of the University of Toronto, Dr. Gelmon practised in Vancouver, B.C. He passed away September 7, 1990 at the age of 70. He is survived by his wife, Laverne and two daughters, Reesa and Debbie.

Hackie, Dr Theodore J.: Dr Hackie passed away Friday, October 19, 1990 at the age of 74. He is survived by his loving wife Marie, brother Dr. Edward Hackie and nephew Dr. Edward Hackie, Jr. A graduate in Pharmacy, Dr. Hackie joined the Royal Canadian Dental Corps after graduation from the University of Alberta in 1942. In 1946, Dr. Hackie opened a practice in Kelowna, B.C. Following studies in Dental Orthopedics at the University of Glasgow in Scotland where he obtained a DDO degree, Dr. Hackie restricted his practice until he retired in 1986.

McDonald, David Henry: Dr. McDonald passed away after a long illness on Sunday, September 23, 1990 at Wellesley Hospital in Toronto. He was 77 years old. He was a graduate of the University of Toronto (1938); he was a Life Member of the Canadian Dental Association.

Oswald, George Alexander: Passed away at St. Catharines, Ontario, on September 5, 1990, at age 79. Dr. Oswald graduated from the University of Toronto in 1936 and served with the Canadian Dental Corps during World War II. He was a Life Member of both the Ontario and Canadian Dental Associations.

Panar, Bernard D.: Dr. Panar passed away at the age of 69. He was a graduate of the University of Toronto in 1945 and was a resident of Vancouver, B.C.

Plante, Réjean: décédé le 4 octobre dernier des suites d'une maladie. Le Dr Plante était alors dentiste-conseil au Département de santé communautaire de l'Hôpital Saint-Luc, à Montréal.

Gradué de l'Université de Montréal en 1956, il devient détenteur d'un doctorat en chirurgie dentaire et débute sa pratique privée, la même année, dans le quartier Villieray. Il y aura consacré 31 années de sa vie, c'est-à-dire jusqu'en 1988. Concurrément, il entrait au service de la Ville de Montréal en 1957 à titre de dentiste-clinicien du service de santé. Il était rattaché à la clinique Rosemont. En plus des traitements dentaires curatifs usuels, le Dr Plante s'est particulièrement distingué au niveau des soins orthodontiques de nature préventive.

En 1983, à sa demande, le Dr Plante était transféré au Département de santé communautaire de l'Hôpital Saint-Luc, à Montréal, et allait assister le Dr Martin Payette à la réalisation d'une enquête dentaire épidémiologique d'envergure provinciale, l'« Enquête Santé Dentaire Québec 1983-1984 ». C'est à la suite de sa participation à cette étude qu'il allait décider, véritablement, d'orienter sa carrière vers la recherche dentaire épidémiologique. À partir de janvier 1988, il pris sa retraite en tant que dentiste à l'emploi de la Ville de Montréal, tout en demeurant dentiste-conseil au programme de santé dentaire du DSC de l'Hôpital Saint-Luc.

En tout, il aura participé à 11 projets de recherche différents et son nom apparaît sur plus de 10 publications différentes. Son oeuvre est celle de presque toute une vie, soit 34 années consacrées à sa profession. Il aura été non seulement un des piliers de la santé dentaire communautaire au Québec, mais également de la recherche dentaire épidémiologique.

En plus de ce legs qu'il laisse à la science et à la profession en général, il laisse, à ceux qui l'ont côtoyé durant toutes ces années, un souvenir impérissable. Eulogie de l'équipe de santé dentaire du DSC de l'Hôpital Saint-Luc.

Shapera, Monty G.: Dr. Shapera passed away on October 23, 1990,

in Winnipeg at the age of 65. A 1951 graduate of the Faculty of Dentistry at the University of Toronto, Dr. Shapera first practised in Flin Flon, Manitoba, and moved to Winnipeg in 1958 where he served the suburb of St. James for over 30 years.

Throughout his life he actively participated in community affairs. He was Deputy Mayor in Flin Flon, a past president and lieutenant governor of the Kiwanis Club and served on the boards of his Synagogue and Jewish Child and Family Services. Dr. Shapera was a Life Member of both the Manitoba and Canadian Dental Associations.

Tervit, Thomas: Dr. Tervit passed away suddenly at Burlington, Ontario, on August 14, 1990. Born in Paisley, Scotland in 1941, he graduated from the University of Toronto in 1964. Following graduation, Dr. Tervit first conducted a private practice in Burlington for 13 years before going to Saudi Arabia for three years. On his return from the Middle East, he continued practice in Hamilton.

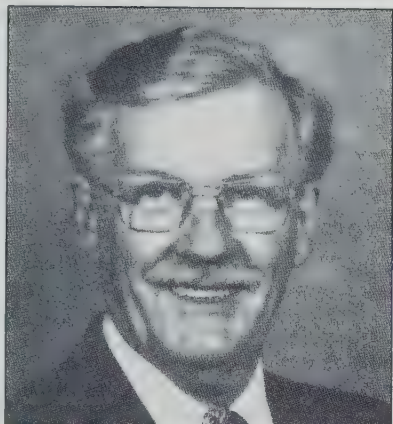


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Former Executive Council Member Passes



Dr. R.A. (Bob) Gray

Dr. R.A. (Bob) Gray, an Alberta dentist with a long history of involvement with his profession passed away on September 16, 1990 at the age of 71.

A native of Rocanville, Saskatchewan, he served in the Armed Services as a Dental Technician. In 1946 he enrolled in the Faculty of Dentistry at the University of Alberta receiving his dental degree in 1950. Following graduation he joined the Royal Canadian Dental Corps. In 1957, he retired with the rank of Major and began a practice in Medicine Hat, Alberta, where he served his community until 1986.

Dr. Gray was President of the Alberta Dental Association in 1966-67 and was his province's representative to the CDA Board of Governors for 1967-77. He was on the CDA Executive Council for the years 1975-77.

A fellow of the International College of Dentistry and a member of the Pierre Fauchard Academy, Dr. Gray received the Canadian Dental Association's Distinguished Service Award in 1981 in recognition for outstanding contribution to the profession.

Dr. Gray is survived by his wife Elsie and six daughters and eleven grandchildren.

The following poem embraces the life of a loving individual who was dentist, storyteller, satirist, singer, one of religious conviction, friend, rock hound, political activist, photographer, gardener and poet. Dr. Gray had penned the following lines just a month before his death.

Then whose shall these things be?

*The question once was asked of a rich man
about his wealth for many
years amassed.*

*He had land — as for life on earth
an adequate supply.*

*He'd ask just one thing. "What
happens when I die?"*

*You see they haven't built a hearse
nor has one been designed
To carry all one's earthly goods
in a U-Haul behind.*

*The wealth that enters heaven's
gates must have gone on ahead
In deeds and gifts to God and man
and prayers that have been said.
Heaven's values are not based on
world's criteria*

So check your net worth once again.

*Don't let God hear you say —
I'll eat, drink and be merry,
I'm going to have a ball.
What if today your Maker should give
the trumpet call?*

*You may have land and bank accounts
however large or small.
Unless you have sent some ahead,
on that day you've left all!*

Dr. R.A. Gray
1919-1990

Letters



DAP Advisor Helpful to Dublin Colleagues

I am writing to compliment you on the DAP advisor articles which I have read in your journal, and have liked very much.

Ours is a large, busy dental practice in Dublin and we would appreciate receiving any information similar to the DAP Advisor that you may have available.

Peter L. Heslin, MB, BDS, FDSRCS (Eng.)
Dublin, Ireland



Tooth Whiteners: Marketing Ploy

On page 796 of the August 1990 issue of the CDA Journal, an advertisement by Den-Mat announces a national advertising campaign for the Rembrandt Whitening System for a September launch.

Included in ads appearing in *Vogue*, *Redbook*, *Cosmopolitan*, *Glamour*, etc., is a request to call a toll-free number for "a dentist near you who specializes in the Rembrandt Whitening System." In order for dentists to be on this toll-free number list, they must purchase a certain amount of the Rembrandt Whitening System.

This marketing ploy places a dentist in Ontario in conflict with our current regulations. Regulation 447, section 37(11) states that professional misconduct means:

"directly or indirectly receiving, making or conferring a rebate, credit or other benefit in respect of drugs, dental appliances, dental material or dental equipment, including those intended to be dispensed to patients."

Roger L. Ellis, DDS, MSc
Registrar
Royal College of Dental Surgeons of Ontario

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The DAP Advisor

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Teamwork plus quality service equals patient satisfaction. In dentistry, as in every service-oriented operation, this is the equation that can lead to success.

At Their Service: How Quality Service Can Lead to Success

In many ways, your practice is unique. It has its own layout and furnishings. It is dedicated to a particular type of dentistry. It is comprised of a singular group of individuals, each of whom has a distinct personality and a particular way of interacting with patients and with each other. And yet, as different as they are, the most successful practices usually have something in common: they are all staffed by individuals who pull together as a team. Above all, this team aims to provide the highest quality service and thereby ensure patient satisfaction.

Why is patient satisfaction the key to success? The answers are obvious — so obvious in fact that they may be easy to overlook. Satisfied patients are more likely to be repeat patients. They are also more likely to voice their pleasure to family, friends and acquaintances on the lookout for similar services. These people in turn may pass on the good word to others.

Generally speaking, practices that strive above all to please patients are also more rewarding places in which to work. Made up, as they are, of individuals who have a common aim and who work as a team to achieve it, these practices offer job satisfaction — the sense of fulfillment which comes from joining forces to provide the highest quality service, and the sense of accomplishment engendered when patients feel well-served.

Because every dental practice is unique, every dental team will work out its own details for satisfying its clients. However, patients are most likely to be satisfied when dental team members consider three broad strategies of quality service. These strategies can be applied to every service-based operation, from dental practices to multinational corporations:

1. Prepare yourself.

Satisfying patients requires thought and planning. At the outset, it is a matter of putting yourself in the patient's place, and seeing your office from the patient's eye view. Usually, a patient sees your office only a few times or less a year. That is long enough, however, to form an impression of your practice that can last much longer. If, for example, your office is cluttered and uncomfortable, patients may see that as an extension of your practice. They may form their impression of you, not on your skill as a clinician, but on the disarray in your waiting room. And they may decide to find another practice — one where neatness counts.

Beyond that, being prepared means attending to the details that keep the practice running smoothly, and hiding the mechanics of your practice from the patient's view. Just as you wouldn't wait till company arrives to vacuum the rug, it's a good idea to make sure that everything is in order when the patient arrives: that the operator is stocked so that the patient's appointment doesn't have to be interrupted by a search for supplies; that the receptionist has the appropriate information and forms ready when the appointment is over; that everything is done to see that the visit runs as efficiently as possible.

Satisfying patients can best be accomplished when each dental team member knows what role to play, and everyone understands how vital that role is to the smooth operation of the practice. With this knowledge, team members can do everything possible to ensure that patients are provided with the highest quality service — service that is prompt, caring and professional; in other words, the kind of service team members would like to receive themselves.

2. Keep the lines of communication open.

In the most successful operations communication is not only encouraged, it is required. That means keeping the lines of communication open at all levels of the organization. In a dental practice, it means open communication between you, your staff and your patients. It can start with something as basic as having team members wear a name tag and address patients by their first name. It can be furthered when team members take the time to listen to patients; when staff have the authority to answer questions, provide information, quell fears and encourage patients to follow through on their treatment plans.

Communication can also mean taking a more pro-active approach to educating patients about good dental health and encouraging an ongoing dialogue between dentist and patient. In so doing, dentists and patients can build a rapport that can form the basis of a successful and long-lasting relationship.

Communication with staff can be just as essential. Meeting with team members individually and as a group on a regular basis can help you build a cohesive, committed dental team.

By keeping the lines of communication open, you can emphasize accessibility and accountability at all levels. These crucial factors in a practice's success will make staff feel their opinions are valued, patients feel satisfied, and increase the likelihood of your hearing about any difficulties or concerns. That way, you can quickly take steps to remedy them, and thereby help foster the loyalty of staff and patients alike.

3. Follow through.

The most successful operations follow through. That is, they are consistent and dependable. They do what they say they are going to do.

In a dental practice, following through is treating each patient the same, both clinically and personally: it is charging patients for missed appointments if that is your clearly-stated office policy; it is adhering as much as possible to a daily schedule and not keeping patients waiting more than is absolutely necessary; it is making patients aware of your practice's mechanisms for recall, and using them consistently; and it is enforcing deadlines on past due accounts.

Of course, you can't accomplish all these tasks on your own. You need the help and support of the right staff — people who have the training and the commitment to make high quality service the priority in their professional lives.



The DAP Advisor is a service of CDA's Dental Awareness Program, an ongoing campaign dedicated to helping all Canadians keep their teeth Good For Life.

Occupational Hazards in the Dental Office

Les dangers pour la santé au cabinet dentaire

1. Brnad, A.A. and Chalmers, B.E. "Stress and the dental practitioner." *Journal of the South African Dental Association*. Dec. 1987, v. 42, no. 12, pp. 729-35.
2. Caplan, S.A. "Dental office ergonomics targets lower back pain." *Dentistry Today*. May 1989, v. 8, no. 4, pp. 45, 53.
3. Caplin, R.L. "Oral surgery: staying healthy." *British Dental Journal*. Jan 21, 1989, v. 166(2), pp. 57-61.
4. Dwyer, A.P. "Backache and its prevention." *Clinical Orthopedics*. Sept. 1987, no. 222, pp. 35-43.
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7. Hensten-Pettersen, A. and Jacobsen, N. "The role of biomaterials as occupational hazards in dentistry." *International Dental Journal*. Jun. 1990, v. 40, no. 3, pp. 159-66.
8. Hjortsberg, U. and others. "Finger receptor dysfunction in dental technicians exposed to high-frequency vibration." *Scandinavian Journal of Work, Environment & Health*. Oct. 1989, v. 15, no. 5, pp. 339-44.
9. Koff, R.S. "Protection against the transmission of hepatitis B virus in dental practitioners: better gloves, earlier vaccination, or both?" *Hepatology*. Jun. 1989, v. 9, no. 6, pp. 902.
10. Konzelman, J.L. "Beyond burnout: viable options for general dentists." *Dental Management*. Mar. 1988, v. 28, no. 3, pp. 45-7.
11. Jacobsen, N. and others. "Occupational health problems and adverse patient reactions in periodontics." *Journal of Clinical Periodontology*. Aug. 1989, v. 16, no. 7, pp. 428-33.
12. Leary, J.M. and others. "An attempt to reduce blood mercury levels of operatory staff during routine dental procedures." *General Dentistry*. Nov.-Dec. 1988; v. 36, no. 6, pp. 511-3.

13. Lehto, T.U. and others. "Hearing of dentists in the long run: a 15-year follow-up study." *Community Dentistry and Oral Epidemiology*. Aug. 1989, v. 17, no. 4, pp. 207-11.
14. Litchfield, N.B. "Stress-related problems of dentists." *International Journal of Psychosomatics*. 1989, v. 36, no. 1-4, pp. 41-4.
15. Locker, D. and others. "Work-related stress and its predictors among Canadian dental assistants." *Community Dentistry and Oral Epidemiology*. Oct. 1989, v. 17, no. 5, pp. 263-6.
16. Macdonald, G. and others. "Carpal tunnel syndrome among California dental hygienists." *Dental Hygiene*. Jul.-Aug. 1988, v. 62, no. 7, pp. 322-7.
17. Macfarlane, A.W. and Field, E.A. "Skin conditions affecting the dental surgeon's hand." *Dental Update*. Nov. 1988, v. 15, no. 9, pp. 383-5.
18. Rahko, A.A. and others. "High-frequency hearing of dental personnel." *Community Dentistry and Oral Epidemiology*. Oct. 1988, v. 16, no. 5, pp. 268-70.
19. Rundcrantz, B.L. and others. "Cervical pain and discomfort among dentists. Epidemiological, clinical and therapeutic aspects. Part I. A survey of pain and discomfort." *Swedish Dental Journal*. 1990, v. 14, no. 2, pp. 71-80.
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22. Wilson, C.E. and others. "Hearing-damage risk and communication interference in dental practice." *Journal of Dental Research*. Feb. 1990, v. 69, no. 2, pp. 489-93.
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24. Wurdack, C.M. "Fit for dentistry." *Contact Point*. Spring 1989, v. 67, no. 1, pp. 7-10.

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ORAL RADIOLOGY

Poyton, H. Guy, Pharoah, M.J.

2nd Edition,
1989, B.C. Decker Inc., Toronto
406 pages.

This is the second edition of this text; the first was published in 1982. As the authors point out, although very little has changed in the field of radiographic interpretation in the last number of years, newer investigative and imaging techniques are now more available. I was very impressed with the quality of the illustrations and the use of black and white diagrams. There are 37 chapters. I have highlighted just a few of their features.

Chapters 4 to 7 deal with radiographic technique starting with x-ray film and processing, and proceed to intraoral and extraoral techniques. Tomography, panoramic radiography and specialised techniques such as, computed tomography, magnetic resonance imaging and nuclear medicine are dealt with. Good interpretation depends on good radiographic technique illustrating the area of interest so I was disappointed with the detail on technique in these chapters. One of the most common intraoral projections, the bitewing, is covered in less than half a page. The bibliography does include, however, references to standard texts on radiographic technique.

Cysts are discussed in Chapter 23. Many classifications of cystic lesions of the jaws are in existence, but there is no reference to the World Health Organization classification. However, that classification is referred to in the chapters on benign and malignant neoplasms.

Chapter 29 discusses fractures and subluxation of teeth. In my opinion, the diagrams showing Le Fort fractures could have been more detailed with regard to the anatomy involved, and the zygomatico-frontal suture should be mentioned in relation to fractures of the zygomatic bone. Figure 29.3 (F) indicates a vertically unfavourable fracture on the right side, but points to the fracture on the patient's left side. The authors indicate that fractures of the middle third of the facial skeleton may be difficult to see radiographically. For that reason, it is advisable to develop a technique of examination; but no mention is made of the use of Campbell's lines for this purpose.

Chapter 32 deals with the temporo-

mandibular joint and refers to the newer imaging techniques. As a vast array of imaging techniques is now available for the TMJ, clinical indications for the use of these techniques might help solve controversy. I would likewise prefer to see indications specified for sialography and perhaps reference to pre-operative implant imaging.

The text is brief and reads more like an atlas than a book. Some illustrations had their legends on a different page. I found this confusing as many figures had more than one radiograph. All chapters have a bibliography but only 17 of 37 chapters had references dated after 1980.

I feel that this will be a very useful text for undergraduate dental students and dentists with an interest in oral radiology.

Reviewed by:
Dónal McDonnell, BDS, FFD, MSc,
Assistant Professor,
Division of Oral Radiology,
Faculty of Dentistry,
University of British Columbia.

DRUGS AND ANESTHESIA: PHARMACOLOGY FOR ANESTHESIOLOGISTS

M. Wood and A.J. Wood

2nd Edition,
Williams and Wilkins,
Baltimore, 1990

Every now and then, a reader comes across a textbook on an apparently standard subject — in this case, pharmacology — that has a slightly different slant and emphasis than most others. **Drugs and Anesthesia** is such a textbook. This hard-covered second edition is the result of the combined efforts of an anesthesiologist and a clinical pharmacologist, as well as the expertise of nine respected contributors.

This textbook contains almost 700 pages. It is divided into four major sections, entitled "General Pharmacological Principles," "Drugs and Anesthesia," "Cardiovascular Therapeutics," and "General Therapeutics." Each section is in turn divided into chapters which total 24 in all. Each chapter contains numerous tables, line drawings and illustrations to enhance and clarify its presentation. While each chapter is not referenced directly in the text, a comprehensive bibliography is found at the end of each chapter. Two appendices and an index conclude the book.

This excellent textbook emphasizes basic pharmacokinetic and pharmacodynamic principles in its presentation. This emphasis shows the effects of these basic principles on each body system stressing both pharmacologic and physiologic interactions. With an ever-increasing number of drugs being given to many patients in both medical and dental practices, these concepts become extremely useful and important to appreciate and understand. This textbook is very effective in presenting its material in this very practical way.

It is somewhat surprising that a textbook of this type is so up-to-date. It is not at all uncommon for review texts to be several years behind current research. A review of the rather extensive list of references found at the end of each chapter shows many to be as recent as 1989! I found this to be an excellent text which is able to effectively integrate actual patient treatment with the major aspects of both pharmacology and physiology. It is not only an effective review, but also adds much new knowledge in a unique and practical fashion. The number of typographical errors — while not excessive — is, however, surprising. Indeed, in several instances, parts of entire paragraphs appear to be misplaced. Despite this, I would have no hesitation in recommending this very relevant textbook to all dental or medical practitioners. It would prove particularly invaluable to those involved in outpatient sedation/anesthesia procedures.

Reviewed by:
Earle R. Young, BSc, DDS, BScD,
MSc, FADSA
Assistant Professor Anaesthesia,
Faculty of Dentistry, University of Toronto,
and
The Wellesley Hospital, Toronto

COLOR ATLAS OF ORAL DISEASES

Scully, Crispian and
Flint, Stephen

J.B. Lippincott Co. Publishers,
Philadelphia, PA.
268 pages, illustrated. \$95.00 U.S.

For many years, a picture has been regarded as the effective précis of a thousand words. To those of us in clinical practice, visual comparisons become a useful tool in establishing a diagnosis.

Over the years, dentistry has benefitted from a few outstanding pathology atlases. A recent addition is *The Color Atlas of Oral Diseases* by Crispian Scully and Stephen Flint.

Because the authors themselves intended this book to be "a pictorial diagnostic aid", there is very little text. What commentary is present is concise but abbreviated. Unlike many other texts, this has pictures of numerous extraoral manifestations to complete the clinical presentation as well as appropriate radiographs. Laboratory tests are excluded and no attempt is made to discuss treatment.

The authors have organized the chapters according to The World Health Organization International Classification of Diseases. Necessity has forced a variance, on occasion, from this classification, but this has been remedied with an outstanding chapter on differential diagnosis.

I have always felt that an equally important part of any volume of this

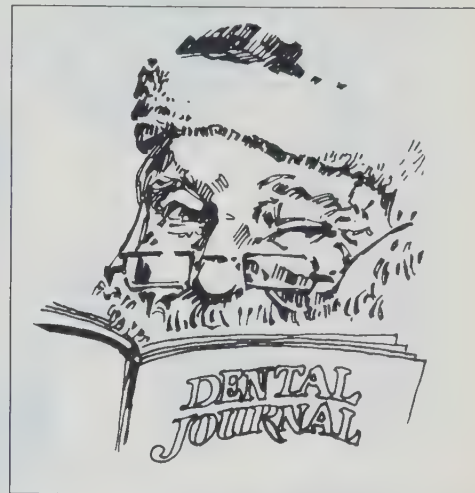
nature is a clinical classification. Here, the authors have created a series of subsections utilizing the clinical criteria of symptoms and site. Especially useful are two tables in this section, one organizing "more common oral vesicobullous disorders" and another differentiating "important types of facial pain". Following this is a chapter containing an additional 228 references up to the end of 1988 for those wishing to explore any of the topics further.

Both authors are members of the Department of Oral Medicine, Surgery and Pathology at the Bristol Dental School and Hospital. The inclusion of over 200 pages of photographs, most from that department, testifies to the impressive patient load they have seen and treated.

The publishers are to be commended for the colour reproductions. Many well-intentioned presentations have been sabotaged by shoddy tints and hues. The arrangement of photographs and other pictorials is informative without being

overpowering. More so than many comparable texts I have seen, this book impressively bears out Sir William Osler's time-honoured observation that the mouth is the mirror of the body's health.

Reviewed by:
John H. Gryfe, DDS, FRCD(c)
Weston, Ontario.



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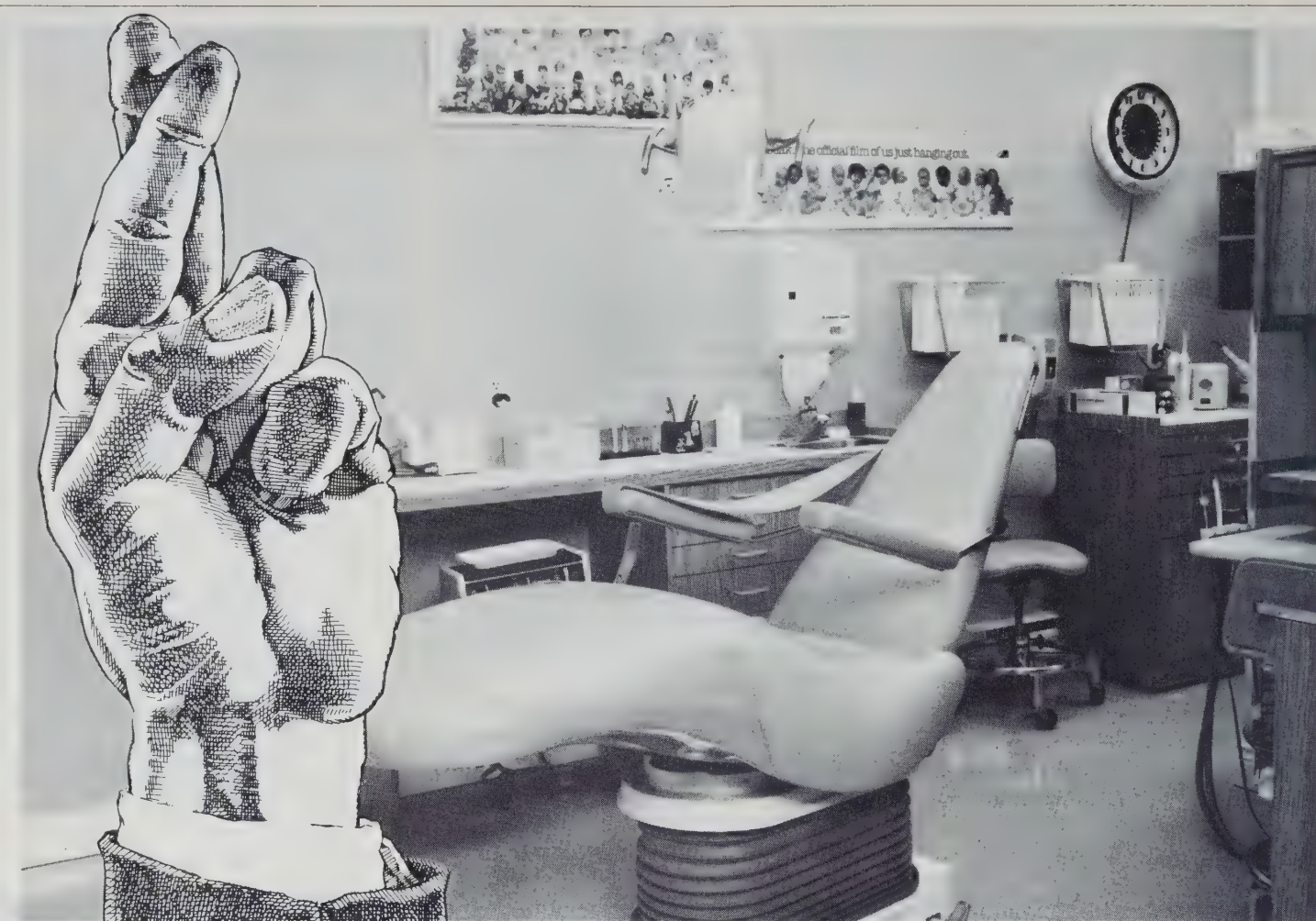
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The Language of Computers!

INTRODUCTION: Automation is an integral part of the business evolution of the '80's and '90's and dentistry is no exception. Insurance companies are rapidly considering Electronic Data Claims. The age of electronic systems is here. Are you ready? Do you have the information you need to make your decision? This the third in a series of six articles on Automation in Dentistry offers an introduction to the sometimes intimidating language of computers.

Today's children see the computer as being a natural part of their education and careers, as we saw the telephone or the television. Computer classroom work is commonplace in schools as early as Grade Three. Our children have routinely completed their homework assignments on our personal computer, utilizing the office laserwriter for a superior looking finished product. However the largest portion of people in the work force today have not had the day to day educational and practical integration of computers in their lives. It's a fact that some people have a natural affinity for computers while others are known to be computer shy or even **computer allergic**. Microchips are part of an ever increasing number of products available for consumer purchase. It's been said that there are more microchip applications than there are MacDonald's hamburgers — and that's a lot of burgers! Computer chips have changed the way virtually everything is manufactured.

Audience is the term used to describe a person's natural enjoyment for a task/procedure or work style. People with computer audience gravitate to the words, the ideas and the concepts readily. It's important to consider that computerization is inevitable at some level for all businesses in the next decade. I believe it's in the best interest of the dental practitioner to know a large portion of the language and how things work. You may not want to know how your car works but "computer mechanics" are not always on every corner. Let's look at some of the jargon of computerization.

1) Hardware

This is the term applied to the actual equipment that you see in a computer system, including the terminals, key-

boards, central processing units, tape back-up units and printers. It's tangible, you can see it, and it's usually sold to you by a hardware supplier. With the ever increasing power available in personal computers, a dental office can comfortably function with hardware currently manufactured in the IBM PS/2 or Macintosh SE30 world.

2) Software

Software or the program determines what a computer can do. There are two types of software: system software and application software. The system software is provided by the hardware manufacturer. It's like the keys for the car — turning it on, setting the direction and providing much of the guidance for the operation of the hardware.

Application software is provided by independent developers who create the "art form" for the hardware you will use. "Code" is the name that programmers use in order to write the software in a manner that the computer can interpret. This is what you see on the screen. The functional aspect of a computer software program is the interpretation of several people (programmers) to allow the apparent tasks of the business to be handled in an effective, convenient and efficient form. It will never be exactly the same way that you may have done it with your manual system.

3) Local Area Network

A dental office is a wonderful place for several computers to be joined together to share information, job responsibilities and peripheral equipment like printers. When more than two computers are connected to common printers and each other for the intention of sharing data, the term local area network describes the

result. In short form, these are called LAN's.

4) Multi-tasking

This is the capability for one computer to operate more than one program or portion of the program at a time.

5) Multi-user

This means that more than one person can use the system at the same time. In a dental office a new patient file should be able to be created while an insurance form is being generated, while a statement is being completed for a patient, while a future appointment is being made. One can expect some speed degeneration while these all occur, however this type of intensity is unlikely to happen very often all at once.

6) File Server

The efficiency of the application software is in the manner that the program is written and the co-processor of the computer. IBM talks of "386" technology, Macintosh says "030". They have the same idea. The faster the co-processor, the quicker the calculations and the faster the screen response. The main processing unit is sometimes called a file server. It sends the patient information out to the network screens for your staff to create patient transactions. It's always best to consider the vulnerability of your file server. If it's not working, nothing else is. A "Maytag" style server is what you want. If you consider a single terminal system, your file server and computer screen will all be part of the same package.

Once you learn these and other terms, you're really ready to tackle the search for a dental software package that will come closest to meeting your practice's

needs. Further increase your knowledge by purchasing some of the current magazines available for computer users. Publications like *PC World* and *MacUser* provide the uninformed with a world of information and ideas about this rapidly accelerating industry. There appears from our perspective to be literally no end to the ability to upgrade, modify or add to your computer system. Consider all of the other applications you might use your computer for besides the administration of your practice.

What about a spreadsheet program to analyze your financial data, or a word processing program for letters? Oftentimes these programs can be built in, or integrated to provide transfer of data from one application to another. If yours is a practice that sends out newsletters, you might want to consider a graphic layout program. In addition some computers have applications for title and slide generation. The dental educator may want to be well aware of these options. It makes little sense to have to run two different styles of computers when one could meet the overall needs of the practice.

What else is there to know? When you really understand what computers are all about you'll be able to successfully answer this question:

"When you turn off the computer, where do all those letters and numbers go?"

Bud Sipko is a private practitioner in Richmond, B.C. Besides having a dental practice, he is the President of Selection Research (BC) Inc., consultants to the dental profession specializing in helping dentists and team members become more effective as healthcare practitioners.

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Priorities for Continuing Education Courses

S.K. Patterson and G.W. Thompson

ABSTRACT

A mail questionnaire on continuing education was sent out to all dentists in Alberta and Atlantic Canada. A total of 415 completed questionnaires were received from Alberta dentists, while the response from Atlantic Canada was 235. A significant majority of the dentists indicated that continuing education was important to them. Those who thought that continuing education was important tended to be more supportive of mandatory continuing education. October is the month that is preferred for courses. In Atlantic Canada, November was the second choice, while February was second in Alberta. The three most significant factors in the selection of a continuing education course in order of importance were: course content, course speaker and location.

SOMMAIRE

On a posté un questionnaire sur la formation continue à tous les dentistes de l'Alberta et des Maritimes. En tout, 415 dentistes de l'Alberta et 235 des Maritimes y ont répondu. Une majorité considérable a déclaré que suivre des cours de formation continue est important et, parmi cette majorité, la plupart seraient en faveur de rendre la formation continue obligatoire. Octobre est le mois préféré pour suivre des cours. Dans les Maritimes, novembre serait le second choix, tandis qu'en Alberta ce serait février. Les trois facteurs les plus importants pour le choix des cours seraient dans l'ordre : la matière, le professeur et l'endroit.

Introduction

The dental profession has often reiterated the importance of continuing education in providing an opportunity for both the maintenance of competence and a search for excellence.^{1,2} With an ever-expanding knowledge base and a rapid increase in new technology, procedures and materials, the need for continuing education has become more important. This is particularly important

in that "all professionals forget much of what is taught in school".³

Many dental organizations, societies and study clubs exist and have done so for quite some time to satisfy this search for knowledge and expertise that many practitioners inherently require. As both the profession itself and society scrutinize the dental profession and its need for quality assurance and competence, this has resulted in legislation mandating continuing dental education in many areas of the country.

The combination of the professions, inherent interest in continuing education, and the external exertion of market and societal pressures, has resulted in a plethora of continuing education courses being made available to the dental profession. The wide range of choice and variation in topic, location, format and speakers coupled with the importance of out of office time due to overhead, business concerns etc., can lead us to a very selective process of choosing venues and types of continuing education. This selection process varies between different groups of dental professionals and has often been shown to display a preference for practical general courses which are mostly in a lecture format and presented by national or regional experts.⁴

Dentists can be classified into three categories or groups relative to their attitudes to continued learning.⁵ One group maintains high levels of competence by their own initiative, regardless of the apparent difficulties in doing so. A second group maintains skills and competence when it is convenient and occasionally attends courses but does not often display behavioural change. The third group resists participation in continuing education regardless of ease of access or pressure. With the attitudes that are demonstrated by dentists, and in an attempt to fulfill the purpose of continuing education for the profession and society, it would be beneficial to design courses that would optimally fill the need of the professionals attending. This would then draw them to these educational venues.

Since continuing education is a very competitive area, an understanding of the decision-making process as it relates to various factors would help in designing courses that are most apt to be sup-

ported. The goal of some sponsors is the monetary gain and/or prestige. For those sponsors whose goal it is to provide quality education, attendance at the course is not an end in itself but hopefully the means to a favourable learning experience that results in behavioural change. Attendance at continuing education courses is not guaranteed to produce learning or change behaviour, but non-attendance or non-participation in the various forms of continuing education makes the learning process that much more difficult.

The 1988 Canadian Dental Association Teaching Conference on Continuing Dental Education recommended that further research in the area of adult learning should be undertaken to determine the real needs of individual learners and develop evaluations to assess effectiveness of current continuing dental education.⁶ This thrust should receive priority, as mandating attendance for continuing dental education does not ensure learning. It is difficult to legislate learning, and as a result, attitudes must be developed in the profession so that the desire for learning exists because of the benefits to the individual, the dental practice and the public that dentists serve. Continuing education will be effective if it is planned to meet the needs as perceived by dental professionals and planned to be the most convenient for date, location, cost and other factors.

Materials and Methods

An anonymous survey was mailed out in 1989 to the thirteen-hundred (1300) dentists practicing in the province of Alberta where the mandatory continuing education requirement exists and to the thirteen-hundred and ten (1310) dentists practicing in Atlantic Canada (Nova Scotia/New Brunswick/Prince Edward Island/Newfoundland) where no mandatory continuing education requirements are present. Four-hundred and fifteen (415) surveys were returned from Alberta for a thirty-two per cent (32%) return and two-hundred and thirty-five (235) were returned from Atlantic provinces for an eighteen per cent (18%) return. The overall response was twenty-five per cent (25%).

The survey first ascertained information regarding demographic data such as year of graduation, practice profile and location and attitudes toward continuing education. The following fourteen factors were then each evaluated on how important they were in the decision to attend various continuing education courses: the cost of registration, cost of travel/accommodation, day of the week, month of the year, speaker, content, format, sponsor, city location, distance, combining with holidays, loss of income, tax deductibility, professional contacts. The three most important factors were listed also. Finally, the individuals indicated how well their needs were being met by various organizations that provide continuing education.

Statistical tests were then performed to evaluate the significance of various factors as they relate to a dentist's location, years of practice, past continuing education and the mandatory nature of the attendance.

Results

The higher percentage of dentists were more recent graduates with 38.9% having graduated in the 1980's with 73.3% in the last twenty years. A total of sixty per cent (60%) of the practitioners were in solo practice, twenty-seven per cent (27%) were in group practices and eleven per cent (11%) were associates. The location of dental practices varied between the two groups with eighty-two per cent (82%) of Alberta dentists in urban settings as compared to sixty-one per cent (61%) for the Atlantic provinces.

The profession's interest in continuing dental education is borne out by the fact that eighty-four per cent (84%) of the respondents indicated that continuing dental education is very important to them and only one per cent (1%) indicated that it was not very important. A total of ninety-seven per cent (97%) felt continuing dental education was one effective way in which the profession can maintain competence and search for excellence.

Half of the dentists surveyed noted that self-study was only somewhat important and of those who felt self-study was very important, most of them were from Atlantic Canada.

There was a difference for mandatory continuing dental education between the two regions. Alberta dentists answered 88.7% in favor of mandatory continuing dental education and 7.5% against. Atlantic Canada dentists had 59.1% in favor and 31.5% against. Dentists in Alberta attended on average three times

as many days of continuing dental education as their Atlantic counterparts.

With regards to undergraduate encouragement towards future continuing dental education programs, only forty-four per cent (44%) of Alberta dentists felt they had been encouraged, compared to fifty-five per cent (55%) of Atlantic Canada dentists.

Both regions displayed similar patterns for the importance of various factors in the decision process. The only notable differences were to registration costs with twenty-one per cent (21%) of Alberta dentists indicating that this had a great deal of importance and fifty-seven per cent (57%) noting that this was somewhat important. Atlantic Canada dentists' responses were twelve per cent (12%) and sixty-four per cent (64%), respectively. Therefore, where mandatory continuing dental education requirements exist, more importance is placed on registration costs or fees.

Alberta dentists rated travel and accommodation costs as having a great deal of importance [thirty per cent (30%) of the respondents], while twenty-two (22%) of Atlantic Canada dentists rated this as important, even though a higher percentage of Alberta dentist practice in urban areas.

Table I outlines the factors impacting on continuing education courses.

The two months that are preferred were firstly, October, and secondly, November in Atlantic Canada or February in Alberta. A total of sixty-one per cent (61%) of Alberta dentists preferred courses on the weekend (Friday, Saturday), compared to seventy-eight per cent (78%) of Atlantic Canada dentists.

The lecture format was one and one-half times more popular than the participation format. Alberta dentists most often attended courses sponsored by dental societies whereas Atlantic Canada dentists show a preference for attending

TABLE I

Factors Affecting Course Choices

Factor	Level of Importance				
	great deal of importance	somewhat important	very little importance	not important	no response
course content	91%	8%	0	0	1%
speaker	72%	25%	1%	1%	1%
location-distance/ travel time	39%	47%	10%	3%	1%
tax deductibility	50%	35%	9%	5%	1%
course format	35%	48%	9%	2%	6%
cost-travel/ accommodation	28%	53%	12%	5%	2%
cost-registration	18%	59%	15%	8%	0
date-day of the week	38%	34%	10%	4%	14%
loss of income	33%	39%	19%	8%	1%
location-combined with holiday	20%	42%	23%	13%	2%
location-city/ attractions	13%	45%	26%	15%	11%
professional contacts made	16%	41%	30%	12%	1%
date-month of year	16%	39%	23%	17%	5%
sponsor	6%	20%	17%	19%	38%

TABLE II

Sponsor Effectiveness

Sponsor	Effectiveness				
	very well	quite effective	somewhat effective	not well	no response
Dental School	20%	44%	22%	12%	2%
Dental Society	18%	45%	23%	11%	3%
Dental Association	9%	41%	32%	14%	4%
Academy of General Dentistry	8%	40%	25%	12%	15%
Private Entrepreneur	12%	36%	26%	16%	10%

courses sponsored by Dental Schools.

The three most significant factors in the decision-making process in order of importance were clearly 1) Course Content, 2) Course Speaker, 3) Location.

Table II demonstrates the perceived effectiveness of various sponsors in meeting the continuing dental education needs of these dentists. The only regional variation was that Alberta dentists indicated that the dental society and private entrepreneurs were important. However, Atlantic Canada dentists had greater support for the courses provided by dental schools.

Those who thought that continuing education was important tended to be more supportive of mandatory continuing education (**Table III**; Chi-square = 19.6; $p < 0.01$).

TABLE III

Comparison of Importance of Continuing Education and Interest in Mandatory Continuing Education

Mandatory	Important		Total
	very	somewhat	
Yes	443	60	503
No	75	27	102
Total	518	87	605

Discussion

A practical level of response was received for the mail questionnaire. The results reported are based on the responses of the 650 respondents. There was no follow-up survey of the non-respondents. However, the results are considered to be representative of provincial attitudes and interests.

Many factors have some degree of importance in the decision-making process as dentists choose continuing dental education courses to attend. Every factor other than the sponsor of the course, was either of great importance or somewhat important to more than half of the responding dentists. Thus, as courses are planned, consideration should be given to all factors that might influence attendance and relate them specifically to the group or region most expected to attend. There will always be some, who because of logistical problems due to the date, cost, loss of income or location, will just not attend or be able to attend.

The key factors indicated by the respondents, relative to all the other factors, were the course content, course

speaker and location of the course. Therefore, to maximize the attendance at courses, these three issues would be of prime importance.

In order to ascertain the areas of content that dentists would be most interested in attending, frequent needs assessments or interest surveys should be conducted which would allow program planners to provide the profession access to the information that they desire. It would be expected that if the content were in demand, dentists would place less emphasis on some of the other factors, such as cost, sponsor, loss of income and even location. They would therefore do all that they could to attend.

The course speaker is very closely related to course content as the credibility of most speakers is based on their area of expertise or subject matter. As with content, it would be of value to assess the profession by region as to determine their preference for speakers, either local or national.

The majority of dentists prefer a lecture given by regional or national experts as opposed to local speakers. The large lecture style presentation is a "challenging" learning environment and often requires a speaker to be a polished presenter or entertainer. An assessment of a regional area of dentists on their preference for various speakers, both local and national, would allow a determination of the relationship between preferred presenters and course content. This would ensure a higher motivation for attendance.

The entire profession must realize however, that the excessive demand for national experts will cause market pressures. This will result in an increase in fees for courses, as the remuneration for presenters who are in demand, will often rise. However, some will realize that there also exists a great wealth of expertise at the local level throughout the nation which can often provide excellent learning opportunities.

Apart from a smaller percentage of courses located in exotic or sport locales and designed to accommodate holiday components, the third most important factor of location was the need for accessibility. Most courses attended by dentists are not associated with their holidays which require out of office time, loss of income, and travel and accommodation expenses. Therefore, the closer the course is located the better. This may vary somewhat regionally, but courses should be located so as to offer potential participants the best opportunity to attend with minimal loss of time or expense. This is especially true for den-

tists in smaller centres where courses are infrequently presented. In Atlantic Canada, where fewer dentists practise in urban settings, more importance was placed on the opportunity for independent study. Future study on the value of distance education and its ability to produce the learning experiences required by the profession, would certainly help to decrease the effect that location has on continuing education.

The emphasis and importance placed on courses within the profession has been substantiated by this survey as the majority of respondents felt that continuing education is very important to them. Almost all dentists indicated that continuing education is one effective way to maintain competence and search for excellence. Those who thought continuing education was very important, were much more supportive of mandatory programs. The decision to make it mandatory is still debated by some even though four Canadian provinces and almost half of the states in the U.S. have adopted guidelines requiring attendance in order to retain licensure. Attendance can be legislated, but not the learning or behaviour change. This has caused some to question the efficacy of mandatory attendance.

The recognition of the popularity of continuing education is evident. Firstly, there is a portion of the profession that will engage in these activities regardless of external pressures or requirements. Secondly, the fast paced change in the knowledge base of dentistry and legal concerns regarding competence, cause continuing education to be a benefit to the practitioner who is staying current and competent. If continuing education is mandatory, there is usually the accompanying taxation benefits that also economically strengthens the motivation to attend and comply with the required education. Thirdly, mandatory programs are also seen by the professionals themselves as a much less threatening form of professional assessment.

Ensuring competence through peer review, in-office evaluation or periodic examination makes mandatory courses a more manageable and desirable means to encourage professionals to maintain their competence. The dental profession practitioner should be capable of monitoring ethically the excellence of the care provided within his/her practice by utilizing the modes of courses and self-evaluation. These are the attitudes, incentives and motivation that need to be instilled in every practitioner.

The goal of mandatory continuing education should not only be attendance, but

the creation of learning experiences that optimally result in positive behaviour changes for the participants in the course. This puts the responsibility for quality education on the professional associations and dental schools.

There is a need for further research in the adult learning experience of dental professionals. It is necessary to assess the actual efficacy of the current modes of presentation.

As continuing education is planned, emphasis must be given to all those variables that are likely to affect the ability of practitioners to attend; especially those of course content, preferred speaker and the location of the course. Δ

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Dr. Thompson is Chairman, Division of Community Dentistry, Faculty of Dentistry, University of Alberta.

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DATE/ LOCATION	COURSE TITLE	SUBJECT AREA	INSTRUCTOR	REGISTRATION	FEE	AUDIENCE
January 19 Vancouver	The Age of Glass	Operative Dentistry	Dr. John Sorensen	Open Lecture	\$125 \$ 75 \$ 95	Dentists Auxiliaries Technicians
January 25 January 26 Vancouver	Photography in Dentistry	Photography	Rita Bauer	Open Lecture Limited (10) (Clinical)	\$ 65 \$175 (Both Days)	Dentists Auxiliaries
February 2 Vancouver	Endodontics in the 1990's	Endodontics	Dr. Marwan Abou-Rass	Open Lecture	\$125 \$ 75	Dentists Auxiliaries
February 8-9 Vancouver	Osseointegration in Clinical Dentistry: Prosthetic Course	Oral Rehabilitation	Dr. George Zarb	Limited Participation	\$750	Specialists General Practitioners
March 2 Vernon	Ortho-Perio-Restorative Interrelationships	Operative Dentistry Orthodontics Periodontics Prosthodontics	Dr. Crawford Bain	Limited Lecture	TBA	Specialists General Practitioners
March 2 Vernon	New Challenges from Infectious Diseases	Infectious Diseases	Dr. Catherine Davis	Limited Lecture	TBA	Hygienists Assistants
March 3-4 Vernon	Oral Radiology for Dentists and Dental Auxiliaries	Oral Radiology	Dr. Hester Rumberg	Limited Lecture	TBA	Dentists Auxiliaries
March 23 Vancouver	Achieving Natural Esthetics	Prosthodontics	Dr. Robert Winter	Limited Lecture	\$125 \$ 75 \$ 95	Dentists Auxiliaries Technicians
April 12-13 April 26-27 Vancouver	Porcelain Laminates: A Clinical Participation Course	Prosthodontics	Dr. Craig Naylor	Limited (9) Participation	\$875	Specialists General Practitioners
April 13 Vancouver	Current Status of Esthetic Dental Materials and Adhesive Systems	Dental Materials and Devices	Dr. Wayne Barkmeier	Limited Lecture	\$125 \$ 75	Dentists Auxiliaries
April 20 Vancouver	Back, Neck and Shoulder Pain STOP IT!	Ergonomics	Dr. Michael Belenky Dr. Lance Rucker	Limited Lecture	TBA	Dentists Auxiliaries
May 4 Vancouver	Periodontal, Occlusal and Esthetic Factors in Crown Bridge Procedures	Prosthodontics	Dr. Jan H.N. Pameijer	Limited Lecture	\$125 \$ 75	Dentists Auxiliaries
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March 9 Edmonton	Emergencies in Dental Practice	Emergency Training	Dr. B.K. Arora	Full-day Lecture	T.B.A.	Specialists General Practitioners Auxiliaries
April 26 Edmonton	Medically Compromised Patients in Dental Practice	Treatment of Medical Compromised	Dr. Raborn Dr. Rothwell	Full-day Lecture	T.B.A.	Specialists General Practitioners Auxiliaries
May 13, 14, 15 Edmonton	Dental Hygiene Refresher Course	Dental Hygiene	Ms. B.A. Zier Ms. J.F.L. Pimlott & Associates	Lecture Participation Limited Attendance	T.B.A.	Hygienists
May 16-17 Edmonton	Root Planing Therapy — A Participation Program	Root Planing	Ms. B.A. Zier Ms. J.F.L. Pimlott & Associates	Lecture Participation Limited Attendance	T.B.A.	Specialists General Practitioners Hygienists
May 27, 28, 29, 30, 31 Edmonton	Conscious Sedation A Participation Program	Anaesthesia	Dr. B.K. Arora & Associates	Lecture Participation Limited Attendance	T.B.A.	Specialists General Practitioners

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December 1 Theatre E	Nitrous Oxide Conscious Sedation	Anesthesia Pain Management	R. Boyar, DMD, MSc	unlimited attendance	\$115	General Practitioners Specialists
December 7	ALPHA OMEGA MEMORIAL LECTURE		C. Castaldi, DDS, MSD		no charge	Dentists
January 9 Hamilton Lecture Theatre	Planning Financial Success for the 1990's (MDHA)	Practice Management Financial Planning	Darcy Robertson, RDH		\$ 35 \$ 50 non-members	Hygienists
January 12 Hamilton Lecture Theatre	Nitrous Oxide Conscious Sedation PART II	Anesthesia Pain Management	R. Boyar, DMD, MSc	limited participation	\$500 includes PART I & III	General Practitioners Specialists
January 26 Concourse Basic Med Sciences	CPR for the Dental Team		R. Boyar, DMD, MSc J. Wood	limited participation	\$ 65	Dentists Auxiliaries
February 9 & 16 March 9 Anniversary Clinic	Nitrous Oxide Conscious Sedation PART III	Anesthesia Pain Management	R. Boyar, DMD, MSc	limited participation	\$500 includes PART I & III	Specialists General Practitioners
February 23 Hamilton Lecture Theatre	Cosmetic Imaging — A Look into the Future Now	Esthetic	Ken Neuman, D.M.D.	limited participation	\$250	Specialists General Practitioners
March 15 & 16	Mini Oral Surgery Residency for the General Practitioner	Oral Surgery	Dr. A. Stoykewych	limited participation	\$350	General Practitioners
April 6 Hamilton Lecture Theatre	MDHA Seminar	Periodontics	Dr. V. Pruthi Dr. J. Perry		\$ 50	Hygienists

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DATE/ LOCATION	COURSE TITLE	SUBJECT AREA	INSTRUCTOR	REGISTRATION	FEE	AUDIENCE
February 15-16 Radisson Hotel Toronto	Financial Planning	Financial Planning Practice Management	Dr. Jack Stockton Multidisciplinary Speakers		TBA	Dentists Auxiliaries

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CONTACT: Jennifer White
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January 31 Toronto	Alternatives in Root Canal Filling	Endodontics	Dr. B. Chapnick		\$110	General Practitioners
January 31 Toronto	Team Approach to the Detection Treatment and Long-Term Maintenance of Patients With Periodontal Diseases	Periodontics	Dr. Eric Freeman		\$ 75	Hygienists
February Toronto	Orthodontics Technique Course: Speed Appliance	Orthodontics	Dr. D.G. Woodside		TBA	Orthodontists
February 28 Toronto	Update on Crown and Bridge Materials	Prosthodontics	Dr. J. Brown		\$110	General Practitioners
February 28 Toronto	The Role of the Dental Hygienist in the Maintenance of Dental Implants	Implantology	Sharon Aitken		\$ 75	Hygienists
March 21 Toronto	The Mercury Controversy and Improving Tooth Strength Through Bonding	Operative Dentistry	Dr. O. Mowafy		\$110	General Practitioners
March 21 Toronto	Hypersensitivity How Can We Help?		Laura Dempster		\$ 75	Hygienists
April 25 Toronto	New Adhesive Materials in Restorative Dentistry	Prosthodontics			\$110	General Practitioners
April 18 Toronto	Continued Competence, Continued Education, Continued Careers — A Personal Approach	Professional Development	Mai Pohlak		\$ 75	Hygienists
May 10-11 Toronto	Periodontal Care for Older Adults	Periodontics			\$350	Specialists Generalists Hygienists
June 8 Toronto	High Tech Root Canal Preparation and Obturation	Endodontics (Hands On)	Dr. Howard Martin		\$225	Specialists Generalists

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DATE/ LOCATION	COURSE TITLE	SUBJECT AREA	INSTRUCTOR	REGISTRATION	FEE	AUDIENCE
January 25 London	Mixed Dentition Orthodontic TX with the Straight Wire Concept for the G.P.	Orthodontics	Donald Gardner	Limited	\$225	Dentists
January 26 London	State of the Art Orthodontics	Orthodontics	Donald Gardner	Limited	\$225	Specialists Only
January 26 London	Update '91	Symposium: Multiple Topics Lecture	A. Burgoynd W.J. Dunn D.R. Gratton R. McConnell H.S. Sandhu P. Sills		\$195	Dentists Auxiliaries
February 8 London	Oral Surgery and a Whole Lot More	Oral Surgery	Myer Leonard	Limited	\$225	Dentists
March 1, 2 London	Optimal Aesthetics The Challenge for the '90s	Aesthetic Dentistry	D.R. Gratton	Limited (20)	\$525	Dentists
April 4, 5 London	Prosthodontic Aspects of Osseointegration for the General Practitioner	Implants	George Zarb	Limited (25)	\$850	Specialists General Practitioners
April 13	Clinical Periodontics Update for Dental Hygienists	Periodontics	H.S. Sandhu D.J. Morrow		\$125	Hygienists
May 4 — I June 1 — II	Clinical Periodontics for Dental Hygienists (Two Sections)	Periodontics	H.S. Sandhu D.J. Morrow	Limited (10 per section)	\$175	Hygienists

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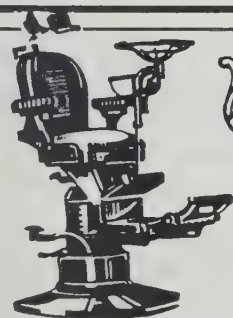
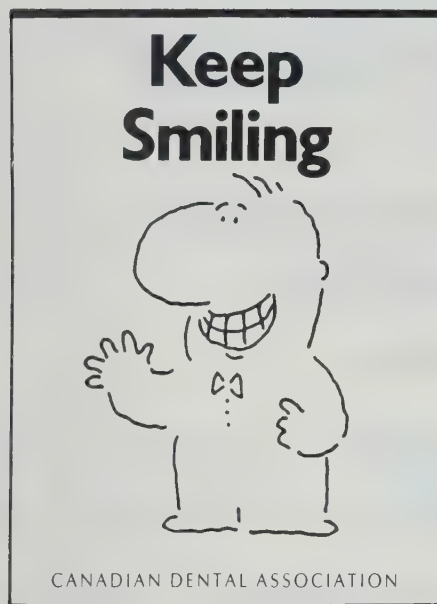
DATE/ LOCATION	COURSE TITLE	SUBJECT AREA	INSTRUCTOR	REGISTRATION	FEE	AUDIENCE
February 2-9 Whistler, B.C. (Ski Seminar)	Update in Restorative Dentistry	Restorative Dentistry	Dalhousie & McGill Faculty		TBA	General Practitioners Auxiliaries

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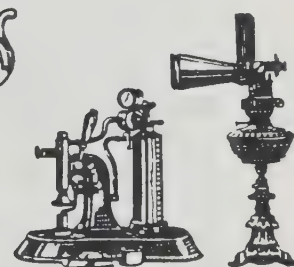
DATE/ LOCATION	COURSE TITLE	SUBJECT AREA	INSTRUCTOR	REGISTRATION	FEE	AUDIENCE
January 18-19 Halifax	Joint "Joint" Course (Advanced) A Multidisciplinary Course	TMJ	Dalhousie Faculty	Limited (30)	TBA	General Practitioners Specialists
February 2-9 Whistler, B.C. (Ski Seminar)	Update in Restorative Dentistry	Restorative Dentistry	Dalhousie & McGill Faculty		TBA	General Practitioners Auxiliaries
February 9 Halifax	Medical Emergencies An Update for the Dental Team	Medical Emergencies	Dr. Kenneth Bentley	Open	TBA	General Practitioners Specialists Auxiliaries
March 23 Halifax	Periodontal Instrumentation Review	Periodontics	Marilyn Kinnear, RDH	Open (morning) Limited (18) (afternoon)	TBA	Hygienists

April 6 Halifax	Drugs and Dentistry	Pharmacology	Dr. Helen Grad Dr. W. Choong Goong Ms. Donna Usher	Open	TBA	General Practitioners Specialists Auxiliaries
April 26-27 Halifax	Update in Orthodontic Appliances	Orthodontics	Dr. William Lobb Mr. Daniel Hold	Open (lecture) Limited (20) (Lab)	TBA	General Practitioners Technicians
May 4 Halifax	A Day of Endodontics	Endodontics	Dr. C.D. Tornick		TBA	General Practitioners Auxiliaries



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Specialty Features

Tooth Whiteners

The Canadian Dental Association and numerous dental offices throughout Canada have received inquiries from concerned patients about the validity and safety of commercial tooth whiteners. In response, the CDA has issued the following statement concerning tooth whiteners:

CDA Statement Concerning Tooth Whiteners

CDA is aware that whitening or bleaching claims are being made by a number of new products containing various types of oxygenating agents as the whitening or bleaching ingredient. Most of these products are in the form of a liquid or gel that is applied (directly by the dentist or by the patient) via a mouthguard tray and worn for several hours daily; others are toothpastes, one of which may be combined with a gel, while some utilize a multistep process consisting of a mouth-cleansing agent, a gel, and one or more polishing creams. Some products are intended to be prescribed by dentists, while others are sold over the counter.

The Committee on Community and Institutional Dentistry has written to the Health Protection Branch of Health and Welfare Canada and asked for its position on these products. Clarification is being sought as to whether these products may be considered cosmetics, devices, or drugs under federal regulations. Products marketed as cosmetics, for example, may escape specific regulation.

These products may be safe and effective. However, concern has been expressed because manufacturers do not have long-term safety data available. Some published scientific studies show that regular use of oxygenating agents may damage temporarily the soft tissues of the mouth, and may delay the healing of already damaged tissue. Other studies show that the use of these agents may cause varying degrees of damage to the pulp of the teeth.

The CDA will advise members of the results of the CDA communication with Health Protection Branch of Health and Welfare Canada. In the interim, although light-to-moderate ageing stains may be visibly reduced by products containing oxygenating agents, the need for longer-term safety studies would suggest a cautious approach. Candid patient disclosure and adequate advice on home care are essential if clinicians choose to use or recommend these products.

*October 1990
Committee on Community & Institutional Dentistry*

The American Dental Association, in response to similar queries, published an article in their August 1990 journal, "What about whiteners?". We are grateful to the JADA and its Executive Editor, Mr. James Berry, the author of the article, for permission to reprint such timely information. (Please see related information in "Letters to the Editor.")

What about whiteners? Safety concerns explored

By James H. Berry

The quest for a brighter, more attractive smile has fueled rapid growth in the marketplace for tooth whiteners. With names like BriteSmile, Denta-Lite, Ultra Lite and Whiter Teeth, these products are grabbing the attention of looks-conscious consumers. More than a dozen whiteners have flooded the market recently, most of them available by dentist prescription, a few being sold directly to consumers over the counter.

There's no doubt these products work as whiteners, at least on mild-to-moderate stains. The looming question is this: are they safe?

This article explores that safety question and seeks to provide practising dentists with some perspective on the issue. . .

Dr. Ronald K. Murayama, inventor of the tooth whitening agent Natural White, hawks his product on a cable television program called "Amazing Discoveries."

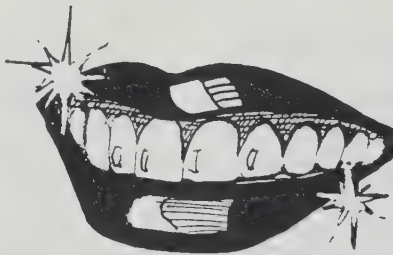
Known in the TV trade as an "infomercial," the show repeats at odd hours in the hodgepodge of the daily cable programming schedule, and delivers a pitch so conspicuous that few would mistake it for anything other than the hard sell it is.

At one point in the program, Dr. Murayama is asked if Natural White is safe. His answer: "The main ingredient in Natural White is oxygen. Oxygen, as you know, is all around us in the atmosphere. We breathe it, we need it to live, so it's perfectly safe."

The active ingredient in most of the dozen or so whitening agents now on the market is 10% carbamide peroxide, a white crystal that reacts with water to release hydrogen peroxide, in turn liberating free oxides. Most of these products are marketed to the dental profession. Exceptions include Dr. Murayama's Natural White and EpiSmile, a dentifrice containing calcium peroxide, both of which are sold directly to consumers.

"He's confusing the issue," Chakwan Siew, Ph.D., says of Dr. Murayama. "Atmospheric oxygen and the oxygenating agents contained in these whiteners are not the same."

Dr. Siew, who heads the ADA Research Institute's Department of Toxicology, says the active agents in whiteners "ultimately break down to hydrogen peroxide



and release oxygen free radicals, a very active species." Citing documentation in the scientific literature, Dr. Siew claims that hydrogen peroxide in other contexts has mutagenic potential, boosts the effects of known carcinogens, may harm periodontal tissues with prolonged use and can delay wound healing.

He says, too, that chronic, unsupervised use of hydrogen peroxide is "capable of altering the normal oral flora, leading to hypertrophy of the papillae of the tongue," or hairy tongue.

"The reason these products work is the same reason we are concerned with safety. Free oxygen radicals have the potential for causing cellular change."

Other possible effects, warns Dr. Siew, include chronic oral infection from opportunistic organisms such as candida albicans as well as the inhibition of certain pulp enzymes. "The implication of this enzyme inhibition is unknown at this time," acknowledges Dr. Siew.

There's the rub. Much about the long-term safety of tooth whitening agents appears to be unknown at this time, say ADA scientists. That the products accomplish what they claim — whitening teeth to give patients brighter smiles — is beyond question. No one disputes that. What's at issue is whether they deliver this benefit without creating some future health problem for those treated. Observes Dr. Siew, "These products work, but at what cost down the road? We need to know that, in the long-run, they won't cause patients any problems."

Adds Dr. Kenneth D. Burrell, secretary of the ADA's Council on Dental Therapeutics, "The reason these products work is the same reason we are concerned with safety. Free oxygen radicals have the potential for causing cellular change. We don't know if that presents a problem. They may very well be safe, but we don't know that for certain and we need to know."

Such words of caution are common to the ADA's approach whenever some new or modified treatment surfaces. The Association is mindful of its obligations to both patient and professional, a responsibility it doesn't take lightly. "They look to us for sound advice," says Dr. Burrell.

Manufacturers, on the other hand, point to research they claim demonstrates the safety of their products. Some firms are cooperating with ADA scientists to help assure the public and the profession that the whiteners they market present no health hazard, that they're safe as well as effective.

EpiSmile and Den-Mat, for example, have supplied the Association with safety and efficacy data on their products, and EpiSmile has been working with Dr. Siew to develop a protocol for future study of product safety. Says EpiSmile's marketing director Robert Walance, "We can appreciate the ADA's concern. They have a responsibility to ask questions of safety. It's our job to answer those questions. But from what we know now, the answers are very positive."

In materials submitted to the ADA in late June, Dr. Robert L. Ibsen of Den-Mat Corp., makers of Rembrandt Lighten, provided six long-term clinical studies that "demonstrate further evidence of safety and efficacy and even an improvement in the patients' oral hygiene."

Among those studies was a series of tests conducted by Drs. Harvey Putter, a New York dentist and faculty member at New York University, and Ronald E. Jordan, dean of the dental faculty at Canada's Manitoba University. Using the Rembrandt Lighten system — a 10% carbamide peroxide gel plus a dentifrice — the two dentists applied the process to 43 arches in 35 patients (346 teeth). Patients wore nightguards — mouthpieces fitted from dental impressions — containing the gel for 1½ hours each evening. Then, before retiring, they would brush

and floss using Rembrandt toothpaste and Rembrandt Lighten. The study, as reported last fall in the Journal of Esthetic Dentistry, produced a "definite improvement relative to the shade of the treated teeth" and left "no sensitivity or unpleasant aftertaste."

"No long-term detrimental effects upon the teeth or gingiva have been observed with this bleaching technique."

In pretreatment discussions with patients, however, Drs. Putter and Jordan acknowledged that "neither the long-term systemic effects of repeated use of the bleaching material nor the presented long-term local effects on oral tissues are known."

But that was last fall. Since then, reports Dr. Jordan, the study has been updated, with positive results. "From a base sample of 40 patients — which we recently updated to 75 — we have developed a six-month recall report on Rembrandt," said Dr. Jordan of the new study conducted at the University of Manitoba.

"In the sample of 40," he continued, "we have seen no indication whatsoever of localized or systemic toxicity. In some cases, in fact, we have seen improvements in gingival conditions."

Den-Mat's Dr. Ibsen believes questions of safety should focus on those few whiteners sold directly to patients over-the-counter. "I think the American Dental Association should be encouraging patients to see their dentist," he said. They should be receiving these treatments only under the care of someone trained to recognize oral health problems, the dentist, and not solely on their own."

Another study often cited in discussions of oxygenating agents involved Proxigel, a product intended for use, like Gly-Oxide, as an antiseptic.

In their study, published last year in Quintessence International, Drs. Van B. Haywood and Harald O. Heymann of the University of North Carolina dental school had a patient use Proxigel at home in a nightguard. The patient used the nightguard for five weeks an average of nearly eight hours each night.

"No long-term detrimental effects upon the teeth or gingiva have been observed with this bleaching technique," the two researchers said in Quintessence. "The reported case is typical of cases treated in this manner. Subsequent patients reported either no sequelae or only mild transient discomfort."

Despite such reports, nagging questions of safety persist. Studies have shown that hydrogen peroxide applied to some teeth tends to migrate to other, untreated teeth and that it is capable of penetrating to the pulp chamber. Though no deleterious effects from these phenomena have been reported in tooth whiteners to date, the ADA is concerned about their meaning and potential.

Still other studies hint at a cancer connection when hydrogen peroxide is used in combination with a known carcinogen. Sigmund Weitzman, M.D., looked at the possible carcinogenic effects from the topical use of hydrogen peroxide on the buccal epithelium of hamsters.

He and his research team found that carcinomas developed when hydrogen peroxide was combined with a known carcinogen (DMBA), used in an effort to mimic the oral conditions of a frequent tobacco user.

Dr. Weitzman reported in 1986 in the Journal of Periodontology that hydrogen peroxide alone did not produce any carcinomas in a 22-week period when the solution was applied twice a week. He further reported, however, that preneoplastic lesions, including hyperchromatic cells and mild dysplasia, were observed in four of nine hamsters. Eight out of nine showed chronic inflammation.

Says North Carolina's Dr. Haywood, "Reasonable advice would be to tell patients to refrain from tobacco use during treatment."

A just-completed animal and tissue-contact study conducted by Chris Wolverton, Ph.D., a biologist at Austin College in Texas, found that a 10% carbamide peroxide solution was no more toxic to tissues than certain dental cements, mouthwashes or toothpaste. He said, too, that, systemically, he detected no potential for mutagenicity.

ADA scientists are not entirely convinced, however. They'd like to see more long-term, controlled study. Says the Association's Dr. Burrell, "We aren't saying they are unsafe, and we know they work when applied to mild tooth stains."

"We may change our stance in the future," he adds, "but right now we have to say that the jury is still out on these products." △

This report was written by ADA Executive Editor James H. Berry.

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Is Your Dental Practice A Profitable Business?

H. Jack Stockton, DMD, CFP, RFP, MBA

ABSTRACT

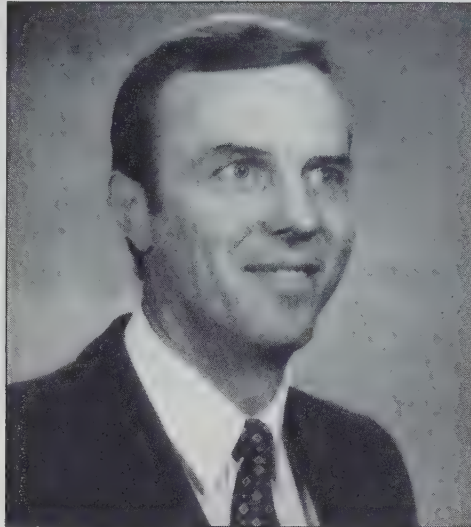
Many dentists are unaware whether their dental practices are profitable businesses. A method to assess dental practice profitability, by determining percentage return on investment (% ROI), is described. The method involves analyzing and adjusting prepared financial statements for a practice, estimating the fair market value of the practitioner's professional and managerial efforts in the practice, and estimating the fair market value of the practice assets. Interpretation of the % ROI determination is discussed.

Introduction

Most dental practitioners are unaware whether they are earning a fair return on the capital investment they have in their dental practices. In other words, the typical dentist is unaware whether his/her practice is a profitable business. This is the author's personal opinion based upon consultations with more than one hundred Canadian dentists in private practice.

The purpose of this article is to present a useful method to assess the percentage return on investment (% ROI) for a dental practice. This method is an important tool to measure business profitability. It requires: (a) recent financial statements for the dental practice, (b) a breakdown of office billings, identifying dentist billings exclusive of laboratory charges, (c) an estimation of the fair market value of the dental practice assets, (d) an assessment of the dentist's managerial effort in the operation of the practice, and (e) a basic ability to interpret dental practice financial statements. The author has developed this analytical method by adapting traditional principles of business analysis to the private dental practice situation.

An owner-operator dentist, who has a capital investment in a dental practice, should be remunerated in three ways:



H. Jack Stockton

- (i) earnings in return for professional dental services provided to patients/clients (professional time, skill, care, and judgement),
- (ii) earnings in return for management skill and effort provided with respect to the operation of the practice (planning, organizing, coordinating, leading, and controlling), and
- (iii) earnings in return for capital investment in the practice (return on investment).

In order to assess the return on investment for a dental practice, it is necessary to analyze the year-end income statement for the dental practice using a systematic approach.

Method

The analytical method presented in this paper has four basic steps. **Table I** presents a hypothetical income statement with allocation of revenues and expenses for a typical dental practice. **Table II** illustrates the application of the method presented in this paper by analyzing the hypothetical solo dental practice (illustrated in **Table I**) which employs a hygienist and has a related dental management company.

The *first step* in this process is to analyze the practice income statement and make necessary adjustments to reported net income. Adjustments must be made in order to fairly reflect the total earnings of the practice. For example, if a manage-

ment company is involved, the pre-tax earnings of the management company must be added to the reported net income of the practice; and/or, if certain expenses of the practice are not directly related to the operation of the dental practice, these expenses must be adjusted by adding them back to the reported net income (i.e., continuing education expense which is really an outlay of a long-term, capital nature). In the case where the dental practice is incorporated as a Professional Corporation (P.C.), the pre-tax earnings are used as the basis for analysis and are adjusted as previously described. In addition, the dentist's salary is added back to pre-tax earnings of the P.C. in *step one*. Depreciation expense should also be adjusted if it does not realistically reflect the actual depre-

TABLE I

Hypothetical Income Statement

REVENUE:	
Dentist	\$ 262,500
Hygienist(s)	\$ 75,000
Lab fees	\$ 37,500
	<u>\$ 375,000</u>
EXPENSES:	
Advertising and promotion	\$ 1,500
Automobile	\$ 900
Bad debts and collection fees	\$ 3,750
Business license	\$ 1,200
Continuing education and conventions	\$ 11,500
Depreciation	\$ 10,000
Dues, licenses, and subscriptions	\$ 2,200
Insurance	\$ 3,000
Interest and bank charges	\$ 15,000
Lab fees	\$ 37,500
Management fees	\$ 33,000
Miscellaneous	\$ 500
Professional fees	\$ 2,400
Rent and utilities	\$ 20,000
Repair and maintenance	\$ 2,250
Salaries and benefits	\$ 93,000
Supplies — dental	\$ 26,250
Supplies — office	\$ 7,500
Telephone	\$ 1,800
	<u>\$ 273,250</u>
NET INCOME	\$ 101,750

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ciation of the practice's tangible assets. The purpose of *step one* is to realistically determine total earnings of the practice by adjusting for factors which distort the true earnings of the practice (i.e., step one in **Table II**).

The *second step* is to subtract from adjusted net income, determined in step one above, the fair market value of the dentist's earnings which represent time, skill, care, and judgement in the provision of professional dental services. This is relatively easy to estimate by determining what the dentist would have been paid had he/she been an associate dentist with no capital investment in the practice, rather than an owner-operator. Remuneration formulae for associate dentists vary from region to region. However, for purposes of the example in **Table II**, a common remuneration formula for associate dentists — 40% of collections less laboratory expense — is used. Normally, direct billings by auxiliaries, such as hygienists, are excluded from the calculation.

The *third step* is to also subtract from adjusted net income, the fair market value of the dentist's management effort related to the operation of the dental practice. This is difficult to estimate accurately since few, if any, individuals are employed exclusively as general managers of dental practices. Also, depending on the staff employed in the office and the practice's emphasis on the importance of management, wide variations exist in dentists' management effort. However, a reasonable estimation of the value of the dentist's management effort must be made. For purposes of the example in **Table II**, the fair market value of the dentist's management effort is estimated at 3% of total practice billings — likely a fair estimate for a typical solo dental practice with no office manager.

The excess income remaining, if any, after subtracting associate-equivalent remuneration (step two) and management remuneration (step three) for the owner-operator dentist from the adjusted net income (step one) will be referred to as return-on-investment (ROI). ROI represents the earnings of the practice allocated to the dentist's capital investment in the practice. The capital investment in the practice is the cash the dentist could receive for the practice if it were sold. To simplify the example in **Table II**, net cash proceeds before-tax upon sale of the practice are used; however, net realizable cash proceeds after-tax would be a more accurate estimate of capital investment in the practice.

The *fourth and final step* in determining

TABLE II

Dental Practice Profitability Analysis

NET INCOME	\$ 101,750
STEP 1:	
Add, Pre-tax management company profit	\$ 25,000
Continuing education expense	\$ 10,000
ADJUSTED NET INCOME	\$ 136,750
STEP 2:	
Less, Dentist's professional remuneration (@40% of Dentist billings)	(\$ 105,000)
STEP 3:	
Less, Dentist's management remuneration (@3% of total billings)	(\$ 11,250)
RETURN ON INVESTMENT (ROI)	\$ 20,500
STEP 4:	
Capital investment in dental practice:	
Total value of dental practice assets	\$ 230,000
Less, Bank loan	(\$ 100,000)
	\$ 130,000
% RETURN ON INVESTMENT (% ROI) (\$20,500/\$130,000)	16%

whether the dental practice is a profitable business is to calculate the percentage ROI (% ROI) for the practice. This is determined by dividing the previously-calculated ROI by the dentist's estimated capital investment in the practice (i.e., step four in **Table II**). The example in **Table II** assumes that the dentist's estimated capital investment in the practice is \$130,000, determined as follows: equipment and furnishings, \$85,000; leasehold improvements, \$30,000; supplies inventory, \$10,000; accounts receivable, \$30,000; and goodwill, \$75,000 — less a practice bank loan of \$100,000.

Discussion

If Canada Savings Bonds (virtually risk-free investments) earn 11.5%, a capital investment in a profitable dental practice should earn more. The % ROI considered adequate for a given dental practice will depend on a number of factors such as quality and reliability of earnings, rate of growth of earnings, and general desirability of the practice. The author's personal assessment — based on approximately eight years of practice management consultations — is that well-established, urban dental practices experiencing moderate growth should expect to show a % ROI of 15% to 20% to be considered reasonably profitable. Some rural practices (particularly in one-industry towns) should show a % ROI of 30% or more to adequately compensate the owner for the

greater risk. Except for start-up practices experiencing very rapid growth, the author considers a dental practice earning a % ROI of less than 15% to be a relatively unprofitable business. Where % ROI is less than 15%, it would make more economic sense to sell the practice, invest the proceeds in a less risky investment vehicle, and become an associate dentist with no management responsibility and no capital investment.

The purpose of this article is to present a relatively simple method of estimating dental practice profitability. The method presented should allow most owner-operator dentists to obtain a good idea of whether their practices are being operated effectively as businesses. However, modifying this method and adding some complexity can make this analysis even more useful. For example, when assessing % ROI for the practice, different acceptable % ROI weightings can be used for goodwill and for the other practice assets in order to reflect the different investment risk associated with the various practice assets (i.e., goodwill is typically a more risky investment asset than dental equipment).

Summary

This method for estimating percentage return on investment for a dental practice is a good measure of business profitability, and it can be used to assess the relative profitability of a private dental

practice. The method presented involves analyzing the practice's financial statements and estimating the fair market value of the practice. The approach is relatively simple; however, those dentists who are unable to interpret financial statements, and/or estimate dental practice value, may require professional assistance to utilize the method. △



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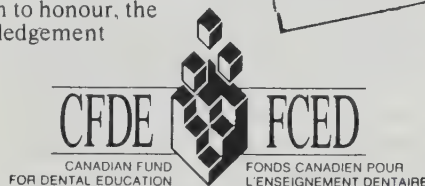
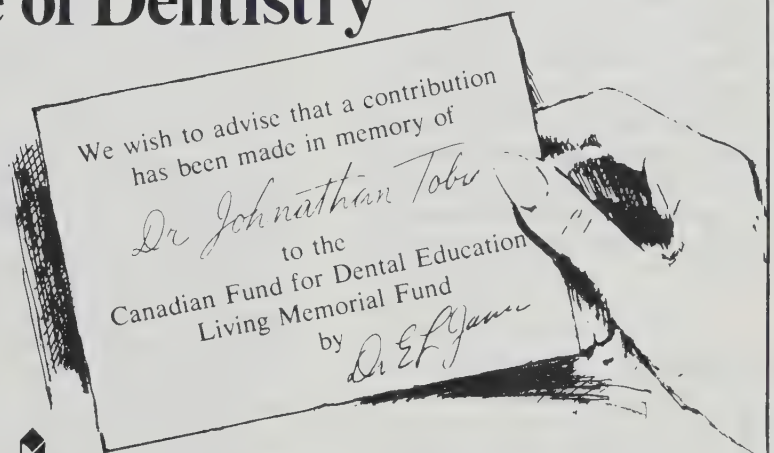
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Potentially fatal hereditary angioedema: A review and case report

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ABSTRACT

Hereditary angioedema is a disease based upon a biochemical deficiency which may result in sudden and unexpected death principally from respiratory distress due to swelling of the pharyngeal tissues. Dental treatment is not an uncommon initiator of such edema. To perform dental care safely, it is necessary to understand the etiology, diagnosis, and treatment of the condition. This article presents a review of these features, and indicates via a case report how knowledge of them was essential in conducting safe, effective and efficient dental treatment.

SOMMAIRE

L'oedème angioneurotique héréditaire est une maladie procédant d'une déficience biochimique qui peut entraîner une mort soudaine et imprévue causée principalement par des difficultés respiratoires à la suite du gonflement des tissus pharyngiens. Il n'est pas rare que des soins dentaires soient à l'origine d'une pareil oedème. Aussi, pour les donner sans risque, convient-il de comprendre l'étiologie, le diagnostic et le traitement de cet état pathologique. Dans cet article, on en présente les caractéristiques et, à l'aide d'un cas, on démontre combien il est essentiel de les connaître lorsqu'on veut donner de bons soins dentaires sans nul problème.

Introduction

Hereditary angioedema is a potentially life-threatening disease. Its onset may be induced by dental treatment. This article will offer an appreciation of the condition by reviewing its etiology, diagnosis and treatment, and by describing how dental treatment was administered successfully to a patient with hereditary angioedema.

Etiology

Historical evidence suggests that hereditary angioedema (HAE) was described initially by Quinche in 1882,¹ while its autosomal dominant inheritance pattern was ascertained by Osler in 1888.¹ The discovery by Donaldson and Evans² in 1963 of the biochemical basis of the disease has permitted both a better understanding and rational treatment.

Feedback mechanisms are naturally occurring methods of controlling or stopping biochemical activities.³ The biochemical abnormality in HAE is focussed upon either a quantitative or qualitative deficiency in such a feedback within the complement system. The complement system plays a significant role in the body's defense mechanisms.³ The system consists of, at least, nine plasma proteins numbered 1 through 9. Once activated, the system creates a cascade of reactions which mediate cell lysis, capillary permeability, interstitial swelling, and clinically evident edema. The cascade is triggered by antigen-antibody complexes.³ Several serum proteins maintain control over this system by "turning it off" at an appropriate time. A protein, C1 esterase inhibitor (C1-INH), is the major control or inhibitor of the so-called "classic" pathway of the complement cascade.^{3,4} C1-INH operates by preventing C1 (the first protein in the complement system) from becoming biochemically active. The inhibition effectively shuts down the complement cascade and limits the amount of interstitial swelling and edema. In HAE, Donaldson and Evans² found that there was a deficiency in C1-INH. Thus, since there is no control of the C1 once it is biochemically stimulated, there will be an uninhibited activation of the entire complement system, resulting in increased vascular dilation and permeability with excessive uncontrolled edema of the affected part.

The complement system may be activated by mechanisms other than antigen-antibody complexes. The Hageman factor

or Factor XII is an integral component of the intrinsic clotting system.^{3,4} Hageman factor is activated by a "hidden" substance, such as collagen, which may be exposed to circulatory blood by injury to endothelial lined vascular channels, especially when the injury is of a blunt traumatic nature as opposed to a sharp scalpel incision.^{3,4} Once activated, Hageman factor may convert plasminogen directly to plasmin or, via the coagulation cascade, produce thrombin which also converts plasminogen to plasmin.^{3,4} In either case, activated Hageman factor creates plasmin which, in turn, is capable of activating the complement system. Hageman factor plays another role by initiating the kallikrein-kinin system, which is an

TABLE I

HAE Treatment

1. Long-Term Prophylaxis
 - Stanazolol
 - Danazol
 - methyltestosterone
 - epsilon-amino caproic acid (EACA)
2. Short-Term Prophylaxis (prior to surgery)
 - Stanazolol
 - Danazol
 - EACA
 - fresh frozen plasma
 - C1-esterase inhibitor
3. Acute Attacks
 - airway compromised
 - intubation
 - tracheostomy
 - epinephrine
 - corticosteroids
 - antihistamines
 - EACA
 - fresh frozen plasma
 - C1-esterase inhibitor
 - abdominal pain
 - analgesics and I.V. hydration
 - extremities
 - usually self-limiting with no specific therapy

integral aspect of the acute inflammatory response via its mediation of increased vascular permeability, vasodilation, smooth muscle contraction and pain.^{3,4}

Three biochemical activities result in vascular permeability and interstitial swelling. These are: complement activation via antigen-antibody complexes; complement activation from plasmin — often secondary to injury; and from the kallikrein-kinin system in acute inflammation.^{3,4} It may be appreciated that, in the absence of the C1 esterase inhibitor, the swelling and edema may become excessive, thus producing the diagnostic signs and symptoms associated with HAE.

Diagnosis

HAE affects males and females in a spectrum of ethnic groups¹ in an autosomal dominant inheritance pattern,⁵ with an incidence which varies from 1:10,000⁶ to 1:150,000.⁷ Although the classical signs and symptoms of the disease are usually experienced around puberty,⁶ it has been reported in pre-school children and infants.¹

The classical manifestations of HAE include episodic, sudden, localized edema of the airway, face, extremities, and abdominal viscera.^{1,4,8,9} Tingling or tightness may precede swelling of the affected part.^{1,9} The edema may last from 4 hours to 7 days with the average duration being 24-72 hours.^{1,4,8,9} The swelling is usually non-pitting, non-pruritic (not itchy), not associated with urticaria (raised skin weals), and non-painful. Unfortunately, abdominal attacks may be accompanied by non-specific abdominal pain, nausea, vomiting, and diarrhea.^{4,8,10,11} The most serious consequence of HAE is swelling of the posterior pharynx.¹ The upper airway obstruction may result in acute respiratory distress and death. In fact, such a compromised airway accounts for 30% of the mortality rate among HAE patients.⁷ Although 54% of patients relate the onset of swelling to trauma¹⁰, 43% consider stress and anxiety to be important triggering factors.^{10,12} Exercise, hypoxia, and ischemia have been implicated as additional stimulators of an HAE attack.¹³ The degree and source of trauma varies from that associated with dental surgery and tonsillectomy, to the tissue damage sustained during sexual intercourse or more mundane activities such as type-writing.^{4,13} Since blunt trauma appears more likely to precipitate an HAE attack than sharp scalpel dissection, it is not surprising that Jaffe and his colleagues¹⁴ reported that dental extractions produced more major complications than all other

surgical procedures.

In addition to the clinical and historical evidence, certain laboratory investigations assist in the diagnosis of HAE. To understand such tests, a brief knowledge of the complement cascade is required. Once activated, C1 (i.e., the first protein of the complement cascade) activates a combined unit of C2+C4 which in turn activates C3 which then activates the remaining proteins in the numerical sequence 5,6,7,8,9.^{3,4} The biochemical basis of HAE is an absence of the C1-INH which results in the uninhibited activity of C1 causing a hypercatabolism of C2+C4 and in turn C3.² Therefore, serum assays which demonstrate decreased levels of C3 and C2+C4 could be useful diagnostic tests. As explained previously, C1-INH abnormality may be of two types, a deficiency in quantity or a deficiency of quality. The former is the commoner disorder occurring in 85% of HAE patients.² In such cases, the concentration of C1-INH ranges from undetectable levels to values of 50% of normal with a mean level of 15% of normal.² The remaining 15% of HAE patients have normal or increased levels of a protein similar to C1-INH but which is functionally defective.⁶ These patients are referred to as having the variant form of HAE. In the common form of HAE, the quantitative level of C1-INH is determined by immunochemical assays, while the functional assessment of C1-INH in the variant form requires more sophisticated research facilities.¹³

The most common complement assays performed in clinical laboratories are C3 and CH50 (total hemolytic complement). Both are often normal in HAE and are not considered reliable criteria for the disease.⁴ Assays of C2 levels are not routinely performed in most clinical immunology laboratories. The assays which are useful are those for C1-INH and C4 levels.⁴ If the levels of C1-INH and C4 are decreased, or if C1-INH is decreased but C4 is normal, HAE (common form) is a possible diagnosis.^{4,10} If C1-INH is normal but the level of C4 is decreased, HAE (variant form) is a possible diagnosis, and a functional analysis of C1-INH should be obtained.^{4,10,13} While these laboratory investigations are useful, the levels of C1-INH and C4 do not correlate with the severity or clinical course of the disease.^{4,13}

Treatment

The treatment of HAE is based upon an appreciation of the biochemical defect and the pathophysiologic systems with which it interrelates. It is convenient to consider

therapy from three perspectives. The first is long-term treatment for patients with previous demonstrated attacks of HAE — especially attacks inducing laryngeal obstruction, frequent face or neck swellings or debilitating episodes which recur at least once per month.^{2,4,5,10} The second is the short-term prevention of an attack prior to a surgical procedure, such as a dental extraction, while the third is the management of an acute attack.

Long-term therapy is accomplished by either androgen hormones or antifibrinolytic agents.⁴ The androgen hormones act by increasing the liver synthesis of C1-INH in a dose-related response^{6,8} thus preventing or decreasing the severity of the attacks. Methyltestosterone and the impeded androgens stanozolol (Winstrol) and danazol (Danocrine) are effective in both forms of HAE.¹⁵ Stanozol and danazol are the drugs of choice because of minimal masculinizing effects; nevertheless, stanozol may cause significant side effects, such as menstrual abnormalities in women and elevated creatine phosphokinase levels in males. Danazol may induce headaches, weight gain, and hematuria.^{8,12,15} The androgens are not used in children and during pregnancy because of potential gonadal damage.^{1,7}

Prior to impeded androgens, the antifibrinolytic epsilon-aminocaproic acid (EACA or Amicar) was the long-term drug.¹⁵ This agent functions by preventing the activation of plasmin after local trauma. This, in turn, prevents the activation of C1 and the complement cascade. It is considered to be partly effective in decreasing the severity of attacks but not their frequency, and is the drug of choice for children who require long-term therapy.^{7,8} Although serious complications such as thromboembolism, phlebitis, and myositis are rare, they have reduced EACA to a second line drug in most instances of long term HAE therapy.¹⁵

Short-term prophylactic therapy is required when surgery is planned, especially during procedures involving the head and neck when laryngeal edema could result in airway obstruction. Accordingly, prophylaxis would be required prior to dental surgery.⁴ The drugs used are hormones, antifibrinolytic agents and fresh frozen plasma. Danazol may be started up to one week before the surgery.^{10,15} The usual dose is 200 mg three times per day.¹⁰ EACA is usually prescribed 2 to 3 days before surgery at an average daily dose of 8-10 g.¹⁵ In 1975, Jaffe and his colleagues¹⁴ established the use of fresh frozen plasma in short-term prophylaxis. Usually two

units of the plasma are given 12 hours before the surgery. It is theorized that the C1-INH in the fresh frozen plasma temporarily raises the level of inhibitor sufficiently to prevent an uninhibited complement cascade.¹⁴ Unfortunately, the C1-INH levels remain effective only from 1-12 days,¹⁴ and this technique is not useful in long-term therapy. In addition, there is the risk that fresh frozen plasma may induce hepatitis B, anaphylactic shock, intravenous hemolysis, and urticaria.¹ There is also the chance that since plasma contains other ingredients of the complement system it could potentiate rather than impede HAE;¹⁵ therefore, it should not be used to abort acute attacks.¹⁰ Nevertheless, according to Jaffe et al.,¹⁴ fresh frozen plasma significantly reduces angioedema in patients undergoing dental or surgical procedures. In short-term prophylaxis, the benefits of careful empathetic patient management and sedatives to reduce stress must not be overlooked.

Unfortunately, there are no drugs which will control an acute attack of HAE.^{1,4} Treatment of an acute episode remains the most difficult aspect of this condition, with airway obstruction being the most dangerous complication. Airway obstruction may be treated with subcutaneous injections of epinephrine (0.2-0.3 ml of 1:1,000 dilution), H1-antihistamines and corticosteroids.¹⁵ The response is not usually good and immediate intubation and tracheotomy are often required.¹⁵ Infusion of EACA has been shown to decrease the progression of the attack, especially in the upper airway.¹⁵ An experimental approach, which has proven successful, is the intravenous infusion of purified C1-INH (the missing compound). Unfortunately, this is expensive and not readily available.^{7,15} An acute abdominal attack is treated by non-salicylic acid narcotics,^{10,15} while acute attacks involving the extremities are probably better left untreated.¹⁵ A brief summary of the treatment methods is listed in Table I.

Additional preventive measures include testing the family members of known patients, and providing medic-alert bracelets to all patients.⁷

Case Report

The patient was a 47-year-old white female, who since nine years of age had recurring angioedema of the limbs, torso, face including eyes and lips, following episodes of head colds and fatigue. While working as a pediatric nurse, the attacks occurred about once every two months and would often be accompanied by nausea, protracted vomiting, abdominal pain

and diarrhea. Up until 1977, she had experienced more than 20 hospital admissions for I.V. fluid replacement secondary to loss from vomiting and diarrhea. Prior to 1977, dental treatment had been uneventful; but in the spring and fall of 1977, severe facial swelling followed dental procedures. The patient believed that xylocaine local anaesthesia was the precipitating factor. Interestingly, the worst episode of angioedema was secondary to a traumatic effusion of the right elbow, probably associated with the blunt nature of such an injury. Although the patient's family had no similar history, she was diagnosed in 1977 as having hereditary angioedema based upon the history, signs and symptoms, and a low C4 level.

Fortunately, none of the attacks induced airway obstructions. Nevertheless, in the period 1982-87, at least four episodes involved the throat. These were considered secondary to upper respiratory tract infections, dental treatment, and fatigue. These attacks did respond to antihistamine (Benadryl 50 mg t.i.d., p.o.) plus either Solucortef or Prednisone.

In March 1987, laboratory investigations demonstrated C1 esterase inhibitor reduced at 48 mg/l (normal 245-543 mg/l), C4 reduced at 0.06 g/l (normal 0.2-0.5 g/l), and total hemolytic complement reduced at 20 units (normal 80-160 units). This confirmed the diagnosis of HAE. Since, in the past, the patient had responded to conventional short-term therapy such as H1-antihistamines and steroids, long-term therapy employing the androgens was not considered justified, unless as short-term prophylactic agents prior to planned major or minor surgical procedures.

In the fall of 1987, the patient was referred to the Department of Dentistry, Ottawa Civic Hospital. Although only relatively simple restorations were needed, the history of HAE and the recent experiences of facial swelling secondary to dental treatment dictated that appropriate preventive measures were required. The patient's attending allergist was consulted; he decided to continue with the previous approach of using short-term prophylactic agents.

Approximately five weeks before the planned dental treatment, base-line levels were obtained with C1-INH at 56 mg/l, C4 at less than 0.06 g/l, and total complement at 20 units. Three weeks before dental treatment, the patient was started on Stanozolol 2 mg q.i.d. One week later, the C1-INH had risen to 112 mg/l, the C4 had increased to 0.10 g/l, and the total complement remained at 20 units. Approximately one week later, the

C1-INH had remained at 112 mg/l, the C4 had dropped slightly to 0.09 g/l, but the total complement had increased to 22 units. During the last week prior to admission, the dose of Stanozolol was increased to 4 mg q.i.d. At the time of admission the patient stated that she had — a few days previously at another hospital on a day-surgery basis — undergone an uneventful laparoscopy and tubal ligation under general anaesthesia supplemented with I.V. Benadryl and Depomedrol. Liver function tests and a C.B.C. performed upon admission to the Ottawa Civic Hospital were normal. Although the dental treatment was to be conducted under local anaesthesia, an anaesthetic consult was obtained for two reasons: 1) to familiarize the anaesthetic service with the patient in case an emergency intubation or tracheostomy was required; 2) to consider the use of antihistamines and steroids as additional precautions during treatment.

On the day of treatment, with the C1-INH level at 111 mg/l, and with 50 mg of Benadryl and 200 mg of Solu-Cortef being administered by the anaesthetist, tooth 3.6 was restored with an MODLV amalgam restoration and tooth 3.7 restored with an MV amalgam restoration with inferior alveolar nerve block anaesthesia using 2.7 ml of 4% Citanest (1:200,000 epinephrine). An OV amalgam was placed in tooth 4.7 without anaesthesia. This treatment was performed without any obvious swelling or discomfort being experienced by the patient. After a further six hours of observation without any evidence of soft tissue swelling, the patient was discharged on a dose of Stanozolol which decreased by 1 mg every 3 days. One week later the patient was well and had experienced an uneventful recovery.

Discussion

Over the past decade, the dental implications of HAE have been reviewed in a number of articles.^{1,9-11,13,14} In each case, the existence of HAE was recognized prior to the dental treatment being performed and a close working relationship was established between attending physicians, anaesthetists and dentists. The articles illustrate a variety of preventive protocols with some centres favouring the use of I.V. sedatives, fresh frozen plasma or EACA. Such co-operative efforts have permitted dental treatment to be performed with minimal complications such as, mild throat tightness,¹⁰ unobstructed swelling of the soft palate and uvula¹¹ and transient abdominal pain.¹³ However, in one case, even with preven-

tive therapy, acute airway obstruction requiring intubation did occur 30 seconds after a tooth removal.⁹ This, plus the fact that 14-33% of HAE patients die of laryngeal edema,⁷ emphasizes the potential hazards which may occur upon treating HAE patients without appropriate prophylactic and emergency facilities. In one instance, a patient had to be hospitalized for 3 days with an HAE attack subsequent to a periodontal evaluation.¹ This illustrates the role that stress and emotional trauma may play in precipitating such episodes, which is another reason to approach HAE patients in a supportive, empathetic but confident manner. Such an attitude demands that any evidence in the medical and dental history suggestive of the signs and symptoms of HAE be investigated by appropriate medical and laboratory methods prior to commencing elective dental treatment. It is suggested that in cases where there is either a strong family history or a failure to respond to a combination of adrenaline, antihistamines and steroids, a provisional diagnosis of HAE be made.¹⁶

In this reported case, the patient did not have a family history of HAE. A similar patient has been reported by Mauro et al¹³ as having HAE, and in a series of cases referred to by Degroote et al,⁹ 7 out of 24 patients had a negative family history. Nevertheless, the patient had the signs, symptoms and laboratory results indicative of HAE. Recognition of this, combined with appropriate short-term prophylactic therapy, permitted uneventful completion of dental restorative treatment preceded by exploratory and gynaecological surgery.

Summary

Although rare, hereditary angioedema is a serious, potentially life-threatening condition which may be induced by dental examinations and treatment. Fortunately an appreciation of the etiology, diagnosis, and treatment of hereditary angioedema by dentists combined with the assistance of medical colleagues, particularly those in the specialties of allergy and clinical immunology, otolaryngology, and internal medicine, permits successful completion of treatment with few, usually minor complications. Δ

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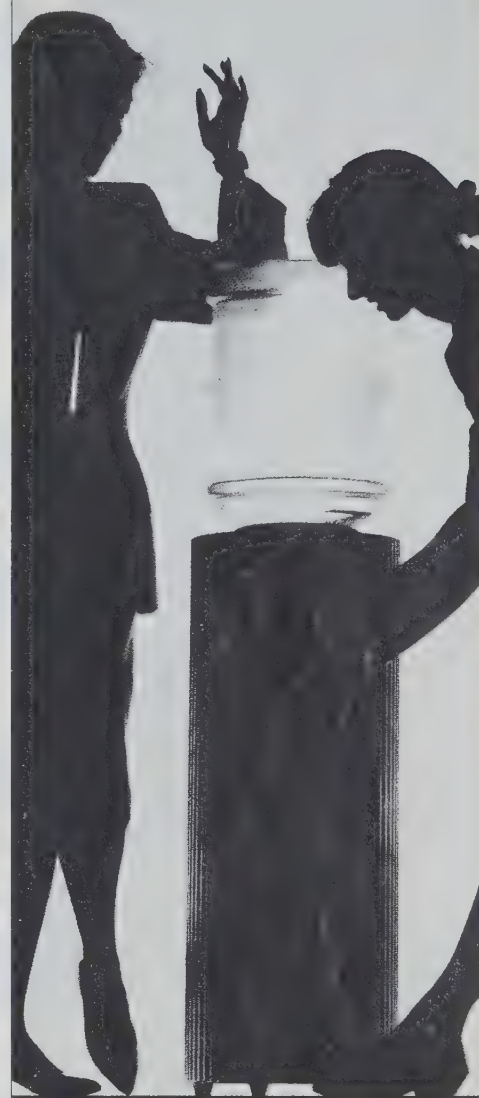
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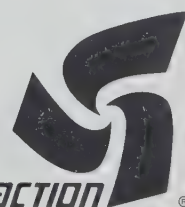
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The influence of frequent ingestion of acids in the diet on treatment for dentin sensitivity

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ABSTRACT

For many patients with severe and persistent pain from dentin sensitivity, therapeutic interventions often produce unsatisfactory results. Eighteen patients with persistent dentin sensitivity following a two-month clinical trial of a desensitizing dentifrice and a two-week treatment of four applications of a topical fluoride varnish participated in post-hoc evaluation of the association between the frequency of acid ingestions in the diet and the persistence of pain. A specific food frequency assessment was performed and tested for association against longitudinal, clinical and subjective patient assessments. There was a negative association ($r=0.49$) between the frequency of ingestion of specific acid foods and beverages and the persistence of dentin sensitivity. Findings suggest that nutritional counselling should be part of the treatment offered for patients with these problems.

SOMMAIRE

Pour de nombreux patients éprouvant des douleurs vives et persistantes aux dents à cause d'une dentine sensible, les soins thérapeutiques donnés sont souvent insatisfaisants. Après avoir pendant deux mois utilisé un dentifrice désensibilisant et après avoir reçu en deux semaines quatre applications topiques d'un vernis fluoruré, dix-huit patients se sont soumis à un examen spécial en vue de voir s'il pouvait y avoir un rapport entre la fréquence des ingestions acides dans le régime alimentaire et la persistance des douleurs. On a procédé à un examen et à un essai avec des aliments absorbés avec une certaine fréquence pour voir s'il y aurait un rapport avec les examens longitudinaux, cliniques et subjectifs. On a découvert un rapport négatif ($r=0,49$) entre la fréquence d'ingestion de certains aliments et de certaines boissons acides et la persistance de la sensibi-

lité dentinaire. D'après ces résultats, il paraîtrait indiqué de donner des conseils diététiques aux patients ayant ce genre de problèmes.

Introduction

The physiological and anatomical basis for the etiology of dentin sensitivity continues to focus on the hydrodynamic theory first proposed by Kramer in 1955.¹ Further support has been added more recently from histological/physiological studies.² Data are sparse, however, on the contribution of behavioral practices in relation to the occurrence of dentin sensitivity.³

Until quite recently, the influence of acid in the diet as a factor in sensitivity was considered only on a theoretical basis,⁴ but Addy, Absi and Adams² demonstrated that tooth surface specimens exposed to both strong and weak acids showed loss of the smear layer which is thought to provide protection over exposed dentin surfaces. Dietary fluids such as wines, fruit juices and yogurt produced similar effects. Interestingly, tannic acids from tea and the formic acids from cola drinks failed to remove the smear layer, suggesting that the particular type of acid dissolution might play a role.

Although this *in vitro* evidence suggested the likelihood of acid ingestion as a contributing factor in the occurrence of dentin sensitivity, no published clinical data appeared to be available. The purpose of this paper was to investigate the clinical relationship between the frequency of acid consumption in the diet and the persistence of dentin sensitivity following treatment.

Methods

Volunteers who responded to commercial advertisements from the surrounding community and patients identified by students from the Faculty clinic were solicited to participate and screened for inclusion in a study which was designed

to test the effectiveness of a dentifrice for the relief of dentin sensitivity. Patients were not offered a financial incentive for their participation, but were promised further treatment after completion of the trial with proven desensitizing methods⁵ if their pain was not alleviated during the study.

To be included in the study, patients had to meet the following criteria:

1. no periodontal surgery or scaling and root planing within the previous three months;
2. free from any medical complications;
3. available for appointments;
4. a minimum level of sensitivity as determined by a subjective rating scale and a clinical testing method (response to a cold stimulus);
5. willingness to sign a patient consent form to comply with therapeutic instructions for the duration of the study.

Dentin sensitivity was measured using subjective and clinical assessments, both of which have been described in detail elsewhere.⁶ Briefly, the patients were asked at the beginning of every appointment to answer three time-referenced questions related to the pain they experienced when toothbrushing, eating cold and hot foods or drinking beverages. The clinical assessments involved placing on the patient's most sensitive tooth:

1) 0.05 ml of 0°C water, and 2) a standard series of scratches on the specific painful location of the tooth surface with a pressure-adjusted periodontal probe using 25, 50 and 75 grams. Pain was quantified in all of these assessments using a visual analogue scale (Present Pain Intensity Scale) adapted from the McGill Pain Questionnaire.⁷

Sixty patients were originally accepted into the dentifrice study and at the end of the two-month study period, 52 remained. From this group, 32 still had a sufficient level of pain which met original entrance requirements for the study. At this time, they were asked to participate in phase 2 of the study which was intended to eval-

uate the effectiveness of four, weekly fluoride varnish treatments for dentin sensitivity.⁵ Of the 32 eligible patients, only 20 completed all four applications. Reasons for the loss of 12 patients were the inconvenience of visits, diminishing levels of pain or a lack of interest in further participation.

For the 20 remaining patients, their pain had not diminished during the original study as a result of using a nonabrasive dentifrice system, an ultra-soft toothbrush, and after receiving toothbrushing instructions to reduce the likelihood of further toothbrush abrasion. After completion of the fluoride varnish treatments, patients were recalled and their dentin sensitivity was again evaluated using the same protocol described earlier.

During this last series of visits, an interesting observation was made. Some patients experienced dramatic relief from pain while others felt little or no relief. Upon questioning, it was learned that many of those who had persistent pain often were frequent consumers of acid foods and liquids. This observation led us to develop a protocol that might investigate this relationship.

Our first problem was to quantify the amount of acid in the patient's diet. From the literature it seemed the options were either to collect a "specific daily" dietary history or to determine dietary practices from a specific food frequency assessment.^{8,9} Because it was the middle of summer and the consumption of acid foods would likely vary due to the availability of fresh fruits; we chose to estimate acid consumption from responses to a questionnaire that focused on a specific food frequency instead of a "specific daily" history. This is a common and reliable method of detailing the frequency of previous dietary intake for specific foods or beverages over time. Foods or beverages were classified as "acid" if their pH was 4.0 or less.² Our assumptions were that all acids would have a similar effect on the smear layer or outer surface of dentin and that the actual quantity of acid consumed per ingestion would not differ significantly among patients.

Of the 20 eligible patients, 18 were interviewed and asked to estimate their specific food frequency, using a frequency per day, week or month unit value, depending on the relative frequency for that particular time. The pH of various foodstuffs was taken from numerous sources¹⁰⁻¹⁵ and that of beverages was determined with a pH meter in a laboratory that tested commercially avail-

able beverages (Table I). The "frequency of acid consumptions per month" was then calculated and tested for association against changes in the different clinical and subjective pain measurements during the study period when varnish treatments were administered. No other treatment therapies were used during this period. The relationship between changes in pain scores and acid ingestion was tested using Pearson correlation coefficients.

Results

The pre- and post-treatment scores for phase 2 of the study are demonstrated in Table II. Differences for the cold stimulus and total subjective assessments were significantly reduced after four treatments with the fluoride varnishes. While no control group was included in this evaluation, the results are included to demonstrate that a portion of the patient group did experience a reduction in pain, while some did not. The intention of this paper was to discover why patients responded differently to the varnish treatments.

Results from the dietary interviews revealed that the average frequency of acid ingestions per month was 265 (s.d. 124), or about 9 per day (s.d. 4). The range was from 639 to 125 per month, or 21 to 4 per day. When changes in clinical and subjective scores were tested for association against the frequency of acid ingestion, an inverse relationship ($r = 0.49$) was found for changes

in response to the cold stimulus. In other words, the more acid in a person's diet, the less likely they were to have a reduction in their response to a cold stimulus. None of the subjective assessments or the scratch test correlated with frequency of acid consumption.

Discussion

Following an exhaustive literature search, no clinical evidence was found to support the association between acid consumption in the diet and the occurrence or persistence of dentin sensitivity after treatment. Although there are weaknesses in the design of this study, specifically in the difficulty in determining accurately the quantity and quality of acid consumed and the lack of controls, a reasonably strong negative association was found between frequency of acid consumption and changes in the responses to a cold stimulus. Notably, most patients who complained of dentin sensitivity made specific reference to pain during and after consumption of cold foods and beverages. Therefore the association that was found might be considered important, relative to one of the patients' most common complaints.

The work of Addy, Absi and Adams² would suggest that different types of acids might have different effects on sensitive dentin surfaces. Our investigation does not support or negate this possibility. It may be that only specific types of acids have a negative effect. Further-

TABLE I

Acidity of Common Foods and Beverages

Food	Approximate pH Range	Food	Approximate pH Range
1. apples	2.9-3.5	2. apricots	3.5-4.0
3. blueberries	3.2-3.6	4. cherries	3.2-4.7
5. cider	2.9-3.3	6. cranberry sauce	2.3
7. fruit cocktail	3.6-4.0	8. ginger ale	2.0-4.0
9. grapefruit juice	2.9-3.4	10. grapefruit	3.0-3.5
11. grapes	3.3-4.5	12. fruit jam, jellies	3.0-4.0
13. lemons/juice	2.2-2.4	14. lime/juice	1.8-2.4
15. mayonnaise	3.8-4.0	16. oranges/juice	2.8-4.0
17. peaches	3.1-4.2	18. pears	3.4-4.7
19. pickles, dill and sweet	2.5-3.0	20. pineapple/juice	3.2-4.1
21. plums	2.8-4.6	22. raspberries	2.9-3.7
23. rhubarb	2.9-3.3	24. sauerkraut	3.1-3.7
25. strawberries	3.0-4.2	26. tomatoes	3.7-4.7
27. vinegar	2.4-3.4	28. wines	2.3-3.8
29. yogurt	3.8-4.2	30. vegetables/fermented	3.9-5.1
31. beers	4.0-5.0	32. coffee	2.4-3.3
33. tea (Orange Pekoe)	4.2	34. relish	3.0
35. A-1 sauce	3.4	36. ketchup	3.7
37. mustard	3.6	38. sour cream	4.4
39. 7 Up	3.5	40. root beer	3.0
41. Pepsi	2.7	42. orange crush	3.1
43. Italian salad dressing	3.3	44. Coke	2.7

more, it seems logical that lactic acid from the fermentation of carbohydrates in the diet might also contribute to dentin sensitivity. Again this is something that was not addressed in this study nor was any attempt made to measure the effect of abrasion on affected surfaces. Notwithstanding the latter, the strength of the relationship that was found was relatively strong.

The ramifications of this relationship for both clinical practice and clinical research into dentin sensitivity would appear to be important. For example, a purported 14.5% of patients complain of dentin sensitivity, yet the dental profession has a rather limited armamentarium with which to treat the problem.⁴ The presence of toothbrush or dentifrice abrasion would appear to explain why many patients have sensitive teeth. Yet in this study attempts to reduce patient's injurious habits seem to have met with only limited success. As mentioned earlier, most of the patients in this study demonstrated cervical tooth abrasion on their sensitive teeth. Yet when a soft or ultra-soft brush was supplied free of charge, patients routinely complained of the brush's inability to properly clean their teeth.

Recession of the free gingival margin from periodontal surgery also may cause dentin sensitivity. When this is the case, only a few of these patients seem to have persistent symptoms,¹⁶ and we would suggest that they be managed in the same way as patients complaining of dentin sensitivity resulting from toothbrush abrasion.

This review suggests that dentin sensitivity is best managed by: 1) using one of the commercially available desensitizing dentifrice systems; 2) removing injurious toothbrushing habits¹⁷ and devices; 3) providing professionally applied topical fluoride treatments, despite the paucity of good clinical research to compare existing systems; and 4) providing dietary counselling to reduce or neutralize the effects of acid in the diet. Obviously, in a patient with severe and persistent dentin sensitivity, all of the forementioned activities should be tried. Continued professional monitoring and treatment through frequent recall appointments should be encouraged. There is little scientific evidence to suggest that persistent and severe dentin sensitivity can be managed by home methods alone.

In the research area, our results have important implications. First, it may be advantageous to determine and perhaps stratify patients with high acid diets or exclude them altogether. Our experience would suggest that their problem is diffi-

TABLE II

Differences in Sensitivity Assessments* Before and After Treatments with Fluoride Varnishes Mean Scores for 18 Patients

Assessment	Before treatment	After treatment
Subjective evaluations	2.8	1.8***
Cold stimulus	5.4	3.7***
Scratch test**	18.4	19.6

* Pain scores range from a low of 0 (no pain) to a high of 8 (severe pain).
 ** Pain scores range from a low of 0 to 24, representing no pain at 75 gm to severe pain at 25 gm.
 *** Differences statistically significant (p = 0.05 or less).

cult to manage. Second, it may be beneficial to have a pre-study period when patients have an opportunity to eliminate both injurious toothbrushing activities and modify their diets. Lastly, one could also keep more rigorous dietary histories during a study period and use these data for a post-hoc analysis. These modifications in design may help to reduce the large placebo effects that are universal in this research, thus increasing the sensitivity of the test. Δ

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Reprint requests to Dr. Clark.

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The use of an anterior cantilever design for an implant retained overdenture: A case report

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ABSTRACT

Dental implants, while providing dentistry with some additional unique options previously unavailable, have also demanded innovation and imagination from the restorative dentist, as illustrated in this unusual prosthetic application. An extremely atrophic anterior mandibular ridge was restored to function, aided by the placement of 3-13 mm titanium fixtures in massive genoid prominences. Second-stage surgery confirmed osseointegration and 3-7 mm abutment cylinders united by a stable tripod superstructure, and provided for a bar assembly extending approximately 10 mm anteriorly to a position representative of the missing anterior ridge. A mandibular implant-retained denture was then fabricated opposing a maxillary metal base denture. The combination resulted in a stable, functional prosthesis and a satisfied patient.

SOMMAIRE

Tout en offrant à la médecine dentaire des choix exceptionnels qu'elle n'avait pas auparavant, les implants dentaires, comme l'illustre ce cas prothétique inhabituel, exigent du dentiste de l'imagination et un esprit novateur. On a remis en état fonctionnel la rebord mandibulaire antérieur d'un patient qui était tout à fait atrophie en plaçant dans les éminences génoides massives des tenons en titanium de 3 à 13 mm. Une deuxième opération a consolidé l'intégration osseuse à l'aide de piliers cylindriques de 3 à 7 mm réunis par une superstructure stable en forme de trépied qui a permis de former une barre se situant à environ 10 mm du rebord antérieur manquant. On a ensuite fabriqué une prothèse pour implant mandibulaire s'opposant à une prothèse maxillaire

à base de métal. On a ainsi obtenu des prothèses stables et fonctionnelles et un client satisfait.

While the fixed-bridge approach to reconstruction of the edentulous mandible with five or six dental implants has been most frequently applied, there are those for whom this treatment is not feasible. The overdenture form of rehabilitation supported by osseointegrated fixtures in the edentulous mandible has been gaining popularity within the segment of the dental community involved with implant treatment.^{1,2} If soft and/or hard tissue deficiencies exist, esthetics can be restored by changing the prosthetic design and enhancing lip and facial support.³

Clinical Report

This is the case report of a 63-year-old female patient who sought care with the use of dental implants for the management of severe mandibular resorption. It was stated at the evaluation interview that she had painful oral mucosa and an inability to stabilize her existing pros-

thesis, causing emotional anxiety and an inability to masticate. Other rehabilitations had failed for this patient. Initial clinical examination revealed an exceedingly atrophic mandibular ridge with a posterior bone height of approximately 4 mm, possible dehiscence of the inferior alveolar nerve, and an anterior ridge that had resorbed to the point of abutting directly with massive genoid prominences in the floor of the mouth. This clinical problem was further complicated by the existing mandibular complete denture functioning against a stable maxillary complete denture in a severe class 11 div. 1 relationship.

Various treatment options were investigated combining the resources of the Prosthetic and Oral Surgery Departments. The severity of the alveolar resorption and position of the muscle and mucosal attachments inhibited the use of a customary prosthesis without the likelihood of frequent pain and recurrent ulcerations. In the final analysis, the recommended course of treatment involved placing two or three Branemark* titanium fixtures in the genial tubercle area, followed by a mandibular prosthesis. The



Fig. 1. A post-operative lateral cephalogram illustrating the position of the fixtures.

Key Words — Case Report

Atrophic mandibular ridge, Branemark* titanium fixtures, tripod bar assembly, mandibular prosthesis.

* Nobelpharma USA, Inc. Nobel Industries of Sweden

proposed design of the mandibular prosthesis, at that point, was based on theoretical speculation utilizing implants for stabilization. All viable alternatives were discussed with the patient, including risk factors, complications and benefits of the anticipated implant-retained prosthesis.

Treatment advanced at the patient's request and on February 3, 1988, 3-13 mm Branemark titanium fixtures were inserted into the anterior mandible. This first-stage surgery was performed under I.V. sedation (10 cc valium and 50 mg Demerol) combined with 8 cc 2% Xylocaine 1:100:000 Ephinephrine local anesthesia. The patient was covered, pre- and post-operatively, with penicillin V (2 grams one hour pre-operatively and 500 mg Q6H for seven days post-operatively).

Second-stage surgery followed on August 31, 1988, confirming osseointegration of all fixtures, and connecting three 7 mm abutments to the fixtures. A lateral cephalogram (Fig. 1), registered post-operatively, illustrates a number of the important aspects of the case history:

1. The positioning of the three titanium fixtures post-operatively.
2. The extent of mandibular resorption.
3. The positioning of the patient's existing or pre-operative mandibular prosthesis (note the marker foil placed on the tissue-bearing surface of the prosthesis).

In addition to the lateral cephalogram, the clinical photographs prior to reconstruction (Figs. 2 and 3) and the schematic diagrams (Figs. 4 and 5) further reveal the position of the fixtures and the challenge of prosthetic reconstruction for this patient. The obvious restorative dilemma was to provide an esthetic and functional appliance which would not cause the lingual border to interfere with the submandibular gland or encroach on the tongue space.

Prosthetic rehabilitation was completed by a custom designed superstructure utilizing individualized waxed bars along with a preformed retentive Dolder Bar (APM Sterngold). The three abutment cylinders were related together with the standard transfer impression technique and this relationship was confirmed with a duralay verification assembly. The superstructure was waxed directly to the abutment cylinders on the master cast, including the interproximal areas and the three anterior extension arms. This assembly was invested in Jelenko complete phosphate bonded investment and then cast directly to the abutment cylinders in Williams extra hard Type IV gold alloy. Two Dolder Bar pieces were then



Fig. 2. Clinical appearance of abutment cylinders prior to reconstruction.



Fig. 3. Clinical position of the implants in relation to patient's existing mandibular prosthesis.

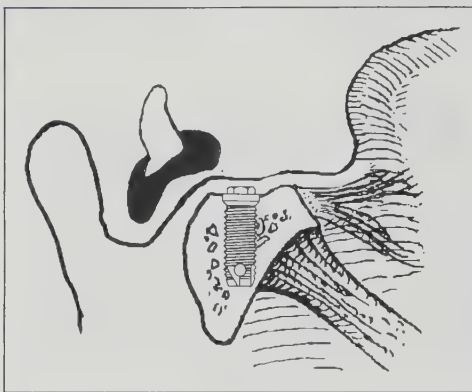


Fig. 4. Schematic representation of the fixtures at completion of stage 1 surgery.

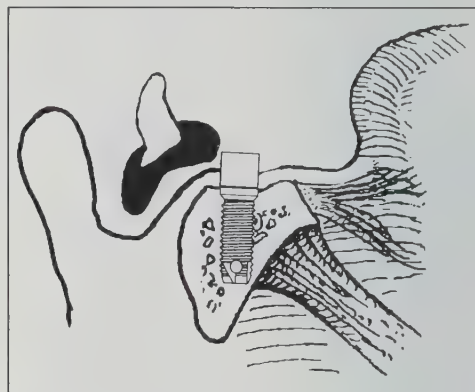


Fig. 5. Schematic representation of abutment cylinders after stage 2 surgery.

adapted to the extension arms to complete the assembly and soldered in place, using 650 fine gold solder (Fig. 6). The pear-shaped bar is designed to provide vertical and rotational action where a stress-broken, resilient type of attachment is desired. It was felt that the stress-broken type of attachment was desirable for this situation due to the anterior cantilever of the prosthetic superstructure. Prior to processing, a spacer was placed between the bar and clip attachment to provide room in the eventual appliance for the vertical and rotational movement.

The mandibular prosthesis was completed, extending lingually in acrylic over the abutment cylinders and anteriorly to engage the Dolder Bar material with standard retentive clips (Fig. 7). The anterior cantilever design created the opportunity to establish a more favorable class 1 occlusal relationship with a new maxillary prosthesis. Concern was expressed regarding the ability of the tongue to accommodate the prosthetic design, but subjective comments by the patient were favorable. Retention and stability of the appliance, as expressed by the patient, were excellent, with no apparent functional or phonetic limitations.

* Nobelpharma USA, Inc., Nobel Industries of Sweden.

Discussion

This case report depicts a unique and innovative application of a combination tissue-borne overdenture form of rehabilitation, osseointegrated implant techniques, and a stress-broken attachment design. Certain benefits and risks are encountered with any form of dental care. The benefit of this form of reconstruction is in the provision of an additional treatment option to solve difficult prosthetic cases. Creation of a stable class 1 occlusal relationship with maxillary and mandibular dentures became feasible, in this case, with placement of implants. This stabilization of an otherwise unsatisfactory mandibular complete denture was made possible with the altered occlusal scheme, and enhanced with the support provided by soft tissue and the Dolder bar.

The risks considered unique to this design were three-fold:

1. The cantilever design complicates analysis of mechanical loading and/or risk. Each fixture is subjected to either a compressive or tensile force, and this is determined by the antero-posterior location of the major force component.⁴ Every attempt was made to minimize this effect and to dissipate functional forces, particularly tensile forces. This was done by

the use of the stress-breaking rotational capacity of the tissue bar design, by decreasing the force application potential of an opposing maxillary complete denture, by maximizing occlusal contacts on the posterior teeth and by relying on the resiliency of the plastic (as opposed to porcelain) teeth.

2. Another apparent risk relates to the so-called "dead" space under the labial and lingual extension of the superstructure. This area represents a structurally weak link in the prosthesis and a potential harbor for bacteria.
3. A further risk, with respect to the lingual flange, is the proximity of the floor of the mouth and mobility of the lingual tissues. It is presumed that on an individual basis, some patients may undergo a fairly long period of mucosal irritation in this area.

All of the above concerns require a rigid recall and maintenance schedule and emphasize the necessity of impeccable oral hygiene. As treatment progressed and was successfully completed with this case, the consensus was that the risks were minimal. Further, it is interesting to speculate on the variables that could be applied to this technique with the advent



Fig. 6. Clinical appearance of cantilever superstructure.

of new technology. For example, the lingual bulk could be considerably reduced with the introduction of angled, second-stage copings, which were not available during the course of this treatment. Δ

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Reprint requests to Dr. Manning.

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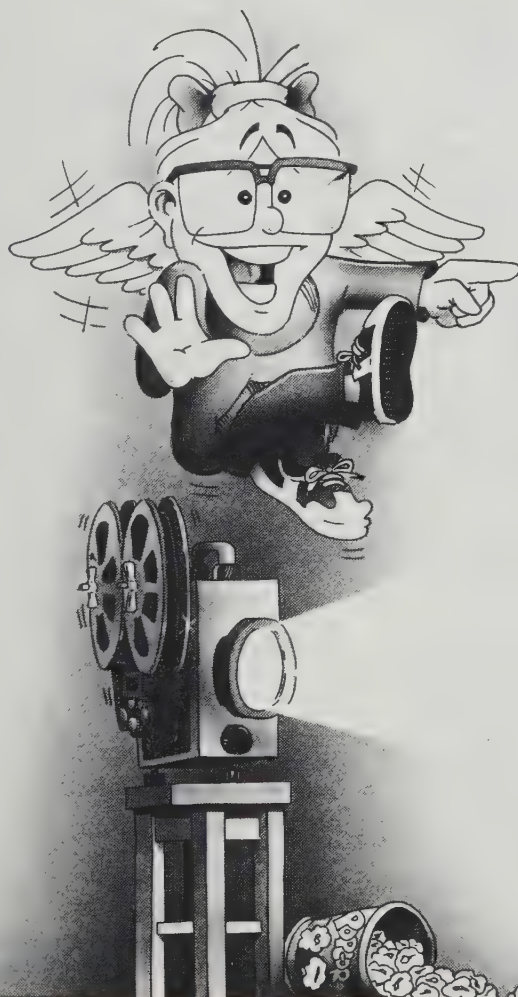
Fig. 7. Insertion of mandibular prosthesis.

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Hi! It's me, your conscience.

Living here in your dreams is like having passes to the world's most exciting movies...with you and me in the starring roles!

Sometimes you're the monster that swallowed the Universe...or the last of the great romantics...and sometimes you're a hero—doing extraordinary things and making people's lives better.

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And like all great stars, you make helping causes you care about look easy.

Could we watch that one tonight?



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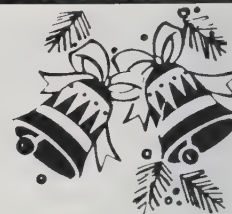
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 Tel: (403) 925-3741
 Fax: (403) 925-3735

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Dental Implants in the Restoration of Elementary as well as Comprehensively Involved Cases

with Dr. Ralph A. Yuodelis
Edmonton & District Dental Society
(403) 434-2542

January 24-25, 1991

Advanced Restorative Techniques with Dr. Alvin J. Fillastre
Calgary and District Dental Society
(403) 228-7122

February 2-9, 1991

Update in Restorative Dentistry in Whistler, B.C.
McGill and Dalhousie Universities
(902) 494-1674

February 4, 1991

New Products and Materials with Dr. Gordon Christensen
Edmonton & District Dental Society
(403) 434-2542

March 13-16, 1991

B.C. Annual Dental Meeting
B.C. College of Dental Surgeons
(604) 736-3621

May 2-4, 1991

Annual Spring Meeting
Ontario Dental Association
(416) 922-3900

May 26-30

Les Journées dentaires du Québec
Ordre des dentistes du Québec
(514) 875-8511

October 3-5

28th Annual Scientific Meeting — Dentistry 2000
Canadian Academy of Restorative Dentistry
(604) 734-3720

January/Janvier 1991

January 13-18: 23rd International meeting of Federacion Odontologica de Centro America y Panama (FOCAP) in Panama. FOCAP combines the membership of the 5000 members of dental societies in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama. Contact: Box 6777 Panama, 5 Panama. Tel.: (507) 64-3230.

January 17-20: Yankee Dental Congress Total Care Through Teamwork in Boston, MA. For more information, contact the Massachusetts Dental Society, 83 Speen St, Natick, MA 01760-4125 or call (508) 651-7511.

January 20-27, 1991: The Barbados Dental Association is hosting its Third Annual Dental Mid-Winter Convention plus Maxillofacial and Craniofacial Surgery Symposium. For further information contact: Alison Hoad (Mrs.), Travel Connection, 3rd Floor Cave Shepherd & Co. Ltd., Broad Street, Bridgetown, Barbados. Telephone: (809) 431-2060. Fax (E09) 431-2067.

January 26th–February 1: 26th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW. Tel.: 071-235-0788.

January 31–February 2: Miami Winter Meeting Committed to Progress at the Hyatt Regency, Miami. For additional information, contact the East Coast District Dental Society, 420 St. Dixie Highway, Suite 2E, Coral Gables, FL 33146 or call (305) 667-3647.

February/Février 1991

February 7-8: Academy of Dental Materials Contact: Dr. S.C. Bayne, Dept of Operative Dentistry, University of North Carolina, 7540 Brauer Hall, Chapel Hill, NC 27599-7450, USA.

February 15-16: American Prosthodontic Society Contact: Dr. H.J. Harvey, 919 N Michigan Ave, Suite 460, Chicago, IL 60611, USA.

February 16-23: Virgin Islands Dental Association Convention in St. Thomas. For convention pre-registration and group travel and accommodation, please contact: Dr. Bob Brandon, 85 Lonsdale Dr., London, Ont. N6G 1T4 or tel.: (519) 657-3368.

February 17-20: 126th Midwinter Meeting of the Chicago Dental Society. Contact: Chicago Dental Society, 401 Michigan Ave, Chicago, IL 60611, USA. Tel.: (312) 836-7300.

March/Mars 1991

March 1-8: American Board of Orthodontics. Contact: Dr. G.D. Selfridge, 225 S Meramec, Suite 310, St. Louis, MO 63105, USA.

March 17-21: 26th Australian Dental Congress in Adelaide, Australia. For more information, contact: National Congress Office, P.O. Box 29, Parkville, Victoria 3052, Australia.

March 27-28: Big Apple New York Dental Meeting. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, NY 10468, USA.

April/Avril 1991

April 6-13: 27th International Alpine Dental Conference in Courchevel 1850 France. For more information, contact: International Dental Foundation, 53 Sloane St., London SW1X 9SW, England. Tel.: 071-235-0788.

April 17-21: American Association of Endodontists. Contact: Ms. I.S. Kudo, 211 E Chicago Ave, Suite 1501, Chicago, IL 60611, USA.

April 17-21: American Association for Dental Research in Acapulco. Contact: Judith Gauchel, 1111-14th St NW, Suite 1000, Washington, DC 20005, USA. (202) 898-1050.

May/Mai 1991

May 2-5: American Academy of Cosmetic Dentistry in New Orleans. Contact: Ms. Barbara Jo Zoeller, 2709 Marshall Crt, Madison, WI 53705, USA.

May 9-12: American Dental Society of Anesthesiology. Contact: Mr. Peter Goulding, 211 E Chicago Ave, Suite 948, Chicago, IL 60611, USA.

May 12-15: American Association of Orthodontists. Contact: Ms. Audrey Schaper, 460 N Lindbergh Blvd, St. Louis, MO 63141, USA.

May 19-24: Academy of Denture Prosthetics. Contact: Dr. Charles Swoope, 1515 - 116th Ave NE, Suite 303, Bellevue, WA 98004, USA.

May 25-28: American Academy of Pediatric Dentistry in San Antonio, TX. Contact: Dr. J.A. Bogert, 211 E Chicago Ave, Suite 1036, Chicago, IL 60611, USA.

June/Juin 1991

June 5-8: Medical/Hospitech 91 in Bangkok, Thailand. For more information, contact: SHK International Services Ltd., 23/F, 151 Gloucester Rd., Wanchai, Hong Kong.

June 5-12: American Dental Hygienists Association. Contact: Ms. Kathy Gallagher, 444 N Michigan Ave, Suite 3400, Chicago, IL 60611, USA.

June 10-14: 2nd Iberian-Latin American Congress on Preventive Odontology & 2nd National Congress on Pediatric Odontology in Havana, Cuba. For more information, contact: Federacion Odontologica Latinoamericana, Calle 4, No. 407 entre y 19, Vedado, La Habana, Cuba.

June 14-17: The Third World Congress on Preventive Dentistry in Fukuoka, Japan. For information, contact: Secretariat of WCPD '81, c/o Dept. of Preventive Dentistry, Faculty of Dentistry, Kyushu University 61, Higashi-ku, Fukuoka, 812 JAPAN.

July/Juillet 1991

July 12-17: Academy of General Dentistry. Contact: Ms. Debbie Jepsen, 211 E Chicago Ave, Suite 1200, Chicago, IL 60611, USA.

August/Août 1991

August 8-11: American Academy of Esthetic Dentistry in Santa Barbara, CA. Contact: Ms. Cheryl Kraus, 211 E Chicago Ave, Suite 948, Chicago, IL 60611, USA. (312) 664-2122.

September/Septembre 1991

September 12-15: International Association for Orthodontics. Contact: Joanna Carey, 211 E Chicago Ave, Suite 915, Chicago, IL 60611, USA. (312) 642-2602.

September 25-29: American Association of Oral & Maxillofacial Surgeons in Chicago. Contact: Lisa Sykes, 9700 W Bryn Mawr Ave, Rosemont, IL 60018, USA. (708) 678-6200.

September 27-30, 1991: 13th Congress of the International Association of Dentistry for Children. Kyoto, Japan. For information contact the Secretariat, 13th Congress of the International Association of Dentistry for Children, c/o Japan Convention Services, Inc., Sumitomo Seimei Midouji Bldg., 4-14-3, Nishitemma, Kita-ku, Osaka 530, Japan.

October/Octobre 1991

October 2-5: American Academy of Periodontology. Contact: Barbara Mueller Connell, 211 E Chicago Ave, Suite 1400, Chicago, IL 60611, USA. (312) 787-5518.

October 7-13: Fédération Dentaire Internationale in Milan, Italy. For information, contact: Janice Edgar, c/o Canadian Dental Association, 1815 Alta Vista Dr, Ottawa, Ont. K1G 3Y6 (613) 523-1770.

October 9-13: American Society of Dentistry for Children. Contact: Carol Teuscher, 211 E Chicago Ave, Suite 1430, Chicago, IL 60611, USA. (312) 943-1244.

Offices and Practices

BRITISH COLUMBIA—Central Interior: 10-year-old general practice for sale. Office is 5 years old. 1500 sq ft, 4 operatories, room for 5th. Full-time hygienist. High gross on 35 hr work-week. Suitable for experienced dentist or two new graduates. Please reply to CDA Box 2472.

(08-03/13)

BRITISH COLUMBIA—Chilliwack: For sale. Thriving, quality family practice established more than thirty years. Easy access to Vancouver in a steadily growing recession-resistant community. Owner will assist the smooth transition during takeover. Professionally appraised and reasonably priced. Exceptional opportunity for experienced dentist or two new graduates. Call: (604) 792-6616 or (604) 858-6027 evenings.

(12-3/2)

BRITISH COLUMBIA—Meritt: In the scenic south central interior, a 3-hour drive from Vancouver, and 1-hour drive from the Okanagan. A well-established, private family practice for sale, offering professional satisfaction and a sound investment opportunity. Computerized and recently renovated; independent evaluation available; opportunity to invest in dental building; will associate to ensure smooth transition. Ideal family community with excellent year-round recreation. Reply in confidence to CDA Box 2499.

(10-6/12)

BRITISH COLUMBIA—Victoria: well-established family practice for sale, located in a beautiful suburb of Victoria. Practice has a high gross-low overhead with a comfortable 4-day work week. Owner planning an early retirement for health reasons. This practice is located in the heart of some of the best fishing, sailing, golfing, and skiing in the world with a mild year-round climate. Please call: (604) 598-0809 or (604) 477-2565.

(09-19/11)

BRITISH COLUMBIA—Vancouver: Busy general practice for sale. Two-year-old office, 700 sq ft, two operatories, room for three, ceiling TV, Panelips, low overhead. Well-situated next to major tenant in shopping mall. Call Dr. P. Ng, office (604) 873-8117.

(10-1/10)

BRITISH COLUMBIA—Vancouver North Shore: Growing practice. A very

attractive facility. Call Don Lauriente (604) 736-3621.

(12-4/12)

BRITISH COLUMBIA—Victoria: Well-established, high-quality family practice with good recall programme. Modern, well-equipped, three operatories, PAN. Located in professional building adjacent to major shopping centres. Beautiful Victoria is growing rapidly. Call (604) 721-0091 evenings.

(11-6/12)

BRITISH COLUMBIA—Victoria: This strategically located general practice is in a small strip shopping centre at the intersection of major traffic routes. High average gross with excellent growth potential in family area. Victoria is a "cosmopolitan town" with the best of ocean-side living. Please call (604) 538-6037.

(11-1/11)

BRITISH COLUMBIA—Victoria and Gulf Island: Something different. 2 days a week in a children's hospital in Victoria. One day on each of two beautiful Gulf Islands. Great life style, low overhead, interesting work at a reasonable pace. Good gross. Call evenings, (604) 652-4970

(06-08/13)

ALBERTA—Central: Thriving dental practice for sale. Population 13,000. Excellent four-operator office in modern building. Call (403) 672-3033.

(09-04/13)

ALBERTA—Edmonton: PRACTICE FOR SALE. Established general practice. Five operatories, central location, low overhead. Telephone (403) 422-2783 (days), (403) 467-6887 (evenings).

(09-03/12)

SASKATCHEWAN: Practice for sale. Large rural Saskatchewan practice for sale. Buyer to take overlease as purchase price. Excellent opportunity. Please write CDA Box 2483.

(08-09/13)

MANITOBA—Winnipeg: Ultra-modern two-year-old dental practice in prime strip mall for sale. Excellent exposure, growing practice with new A-DEC equipment, great potential. Owner has accepted federal government contract. Contact business manager at (204) 832-0578 or write to 125 Sunnyside Blvd., Winnipeg, Manitoba R3J 3M1.

(10-2/11)

ONTARIO—Southwestern: Busy, established family practice for sale in small town near Lake Huron. Modern 30' x 50' building, air-conditioned, 2 well-equipped operatories. Reception and business

areas, lab, kitchen, bathroom, private office and staff room (or third operator). Very competent, well-trained staff available with practice. Excellent income, low overhead. Please call (519) 482-5864.

(12-6/2)

QUEBEC—Montreal: Dental clinic and laboratory for sale. Two operatories. Private parking with or without building. Front metro. Good gross. Latin, Spanish, English, French, Greek, etc. clientele. Owner may stay to introduce buyer. Please reply to CDA Box 2494.

(07-18/11)

NEW BRUNSWICK—Bathurst: Busy, established family practice for sale. Newly renovated office. 30 new patients per month with strong recall base. Owner leaving area and willing to negotiate price. Reply in confidence to CDA Box 2500.

(07-14/13)

NEWFOUNDLAND: DENTAL OFFICE FOR SALE. High volume, low overhead dental office situated in a pharmacy building. Office is complete with one fully-equipped operator including x-ray and central suction. Another suitable for examinations, extractions, etc. Fully-computerized front desk with good, dependable software. For information, contact. Bill Witherell, PO Box 159, Grand Bank, NFLD A0E 1W0. Telephone (709) 279-4190, 891-1551 or 832-0550.

(12-7/1)

Associateships Available

YUKON: Associate required for spring 1991 in modern, six-chair, well-appointed dental practice. Please contact: Dr. R.E. Pearson, Suite 4, 3089 Third Ave, Whitehorse, Yukon Y1A 5B3 (403) 668-3152.

(12-1/2)

BRITISH COLUMBIA—Victoria: One of Canada's most beautiful cities. Associate required to take over existing case load and share new patients (approx. 140/month) in our total care, progressive practice. Large modern office currently has 3 dentists. Potential future partnership. Dr. Donald Bays Call collect (604) 381-6433 (w) or 595-8050 (h).

(09-05/11)

ALBERTA—Calgary: Excellent opportunity to associate in a group practice with 5 dentists and a part-time orthodontist.

We are looking for a self-motivated, skilled and caring clinician with an outgoing personality. Our location is one of Calgary's fastest growing suburbs with a strong patient base and lots of potential for growth. The office has been professionally designed; all operatories have natural light and are fully-equipped with P&C chairs, A-DEC carts, Kabo hand-pieces and x-ray. We are up-to-date with all phases of dentistry, sterilization and asepsis. In house lab for prosthetics and splits; C & B lab across the hall. Dentists and assistants perform all hygiene services. We have a topnotch computer system and an efficient staff to monitor production and collection. Reply in confidence to Dr. Dan Goldstein (403) 240-1023. (10-7/13)

SASKATCHEWAN: Associate wanted for large family practice with future buy-in possible. Please reply to CDA Box 2501.

ONTARIO—London: Associateship with opportunity for future partnership in a growing group practice. Six operatories, state-of-the-art facilities — only two years old. Located at Commissioner's Court Plaza, a high gross area. (519) 294-0151 ask for Lia. (11-3/13)

ONTARIO—Ottawa: Full-time associate required for busy, progressive office. Flexible hours, modern, family, preventative practice. Pleasant atmosphere, open concept. Located in Orleans, beautiful suburb of Ottawa. Please call (613) 824-7288. (09-12/11)

ONTARIO: ASSOCIATE/PARTNER Opportunity exists with an exceptional staff to practice all phases of dentistry. Hospital privileges available. Located on the Trent River in scenic Campbellford. Call days (705) 653-2221 or evenings (705) 924-2864. (09-15/13)

ONTARIO—Mississauga: Full-time and part-time associates needed for new modern Mississauga office. Excellent opportunity for progressive practitioner. Storefront location in shopping plaza, 250,000 sq. ft. Modern facilities in professional walk-in medical-dental. Positions available June 1990. Call: (416) 452-7111. (08-07/13)

ONTARIO—Sudbury: Full-time associate required to practice between 2 offices. One storefront with 2 optometrists and 2 veterinarians, the other in a medical/dental building with a library, pharmacy and medical doctor. Am the only dentist servicing about 5000 people. 40-60%

associate percentage offered. Call (705) 522-4252. (08-01/13)

ONTARIO—Woodstock: The Nix Team requires a full/part-time associate for our progressive dental office in Woodstock. We offer a new, state-of-the-art facility and the newest equipment. We focus on warmth, caring and expert communication with our patients. We value preventative and quality restorative dentistry. Please phone Dr. Garry Nix, (519) 539-9161, ask for Sheila. (10-9/11)

ONTARIO—North Toronto: Position available immediately or a paediatric dentist with Ontario certification in a modern, well-established private practice. Full range of dental care provided from preventive to orthodontic services; well care and special needs (mentally and physically compromised) children and adolescents. Associateship with future prospects for partnership or cost-sharing arrangement. Please reply to CDA Box 2426. (08-06/13)

Auxiliaries

ONTARIO—Woodstock: The Nix Team requires a dental hygienist (expanded duty would be welcome) for our progressive office. We value preventative and quality restorative dentistry. Our team offers relocation expenses. We emphasize personal development through continuing education and full participation with other members of our team. Please send resume to: Dr. Garry Nix, 112 Springbank Ave., Woodstock, Ont. N4S 4Y3. ATTN.: Sheila. (10-10/11)

Opportunities Available

YUKON: Denture Crown & Bridge lab technician required for modern dental practice. Please contact: Dr. R.E. Pearson, Suite 4, 3089 Third Ave, Whitehorse, Yukon Y1A 5B3 (403) 668-3152. (12-1/2)

BRITISH COLUMBIA: Dentist retiring. Full-time associates required with an option to buy in the immediate future. Busy practice located on East Broadway and Main in Vancouver. Call (604) 876-0712. (10-4/11)

BRITISH COLUMBIA—Fraser Canyon: 2½-3 hours from Vancouver on Trans Canada Highway. Two long-established, busy, unopposed part-time (could easily become full-time) practices for sale,

together or separately. High net yield. Owner retiring but will stay for transition period. This is an excellent opportunity at a very low asking price. Please phone (604) 669-4648 (weekends) or write Box 717-1755 Robson St., Vancouver, BC V6G 3B7. (11-5/12)

BRITISH COLUMBIA—Richmond: This is an outstanding opportunity for the right practitioner. If you believe that dentistry is largely a behavioral science, value long-term relationships with patients and staff, have an obsession with excellent clinical care, and want to improve the quality of your life and those around you, please call. This is a chance to move from an initial associateship to full partnership. Call Dr. Bud Sipko (O) (604) 270-1341 or (H) (604) 275-8254. (11-2/11)

ONTARIO: Oral and Maxillofacial Surgeon needed for full-scope practice in Southwestern Ontario. Excellent opportunity for strong income and professional satisfaction. Call Dr. Bernard Lyons (519) 258-4563. (12-2/5)

Vacation Rentals

BRITISH COLUMBIA—Blackcomb/Whistler: Luxury, 3-bedroom condo sleeps up to 8, walk to lifts. Call Dr. B. Clarke (519) 886-8980. (10-5/12)

BRITISH COLUMBIA—Whistler/Blackcomb: Walk to village and lifts from my super 3 bedroom + loft chalet! Stunning view, fully-equipped. Sleeps eight comfortably. \$300 per night. Minimum 3 nights. Call Dr. David Speirs (604) 874-3404. (10-11/13)

BRITISH COLUMBIA—Whistler: Three-to-four-bedroom townhouse in Nordic Estates. Three baths, Jacuzzi tub fully-furnished with deck and barbecue. Available for nightly, weekly or monthly rental. Please call, Dr. Ed Murdock, (604) 736-5850 or Dr. Ken Phillips, (604) 433-5756. (09-20/12)

BRITISH COLUMBIA—Whistler/Blackcomb: Luxury 3-bedroom, 2-bath townhouse. Sleeps 6. Fireplace, microwave, VCR. Walk to lifts and Whistler Village. Available weekly. (416) 391-4358. (11-4/1)

MEXICAN RIVIERA—Ixtapa: Pacific ocean view, 3 bedroom villa, 2 baths, air-conditioning, private pool, golf and tennis. 6 star hotel & restaurant next door. Call (519) 426-9140. (09-20/12)

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Over 14,000 dentists and 1,600 dental students read the Journal of the Canadian Dental Association every month. The Journal has a section exclusively for you — the Marketplace. Whether you are buying a practice, selling a practice, or looking for an associate, we are here to give you the best exposure possible.

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*(this offer ends January 1991)

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The classified advertising department of the Journal of the Canadian Dental Association is published as a service to the dental profession. Rates are minimal. Therefore, even on display classified advertisements, no agency commission is payable.

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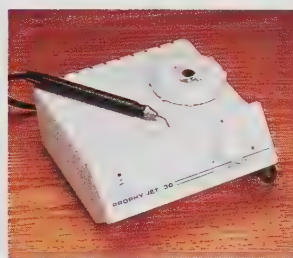
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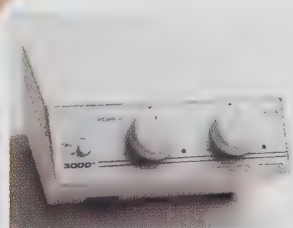
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PROPHY-JET® 30 Air Polishing Unit saves time and minimizes fatigue while polishing coronal surfaces and hard to reach pits and fissures. One study indicated that 94% of the patients treated preferred air polishing to hand instrumentation,

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CAVI-JET® 30 Unit combines Cavitron® ultrasonic scaling and Prophecy-Jet air polishing capabilities for superior efficiency in one compact unit. The dual-function handpiece is small and light. It's comfortable to hold and much less fatiguing than hand scaling and polishing.



CAVITRON 3000 removes calculus faster and more efficiently than any other prophylaxis method. Plus, the Cavitron 3000 Unit has been proven to be less stressful and more comfortable than hand scaling.

"I would recommend the use of Air Polishing to all professionals who want to improve their efficiency and time utilization."

*Data on file at Dentsply/Equipment Division.

¹As published in Clinical Research Associates Newsletter, Vol. 5, Issue 10-October 1981

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What's all the chatter about Trident with Xylitol?

There's been a lot of talk about xylitol lately. Like many other health professionals, you may have heard about it. But do you really know about it? Perhaps it's time you did.

Xylitol - more than just a sweetener.

Xylitol is, quite simply, a natural-source sweetener. However, extensive research conducted over the last decade shows that xylitol cannot be metabolized by decay-causing oral microflora. Therefore, xylitol does not promote tooth decay.

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Xylitol's distinctly pleasant flavour helps give Trident its great taste. What's more, xylitol also absorbs heat when dissolved in the mouth, producing a cool, refreshing sensation. No other sugarless gum in Canada tastes better. So when you recommend

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Because Trident with xylitol does not promote tooth decay, it can play an important role in your patients oral hygiene programme. It's especially valuable as a replacement for sugary snacks.

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We invite you to order Trident sample packs for use in your own practice. And do some chatting of your own.

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_____ x Trident Assorted (Peppermint, Cinnamon, Freshmint, Fruit and Bubble Gum)	PROV.	QNTY.	(Incl. Pst)	AMT.
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_____ x Trident Bubble Gum	N.B.	_____ x	\$44.40 =	_____
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Annual Report

Rapport Annuel



CANADIAN FUND
FOR DENTAL EDUCATION

FONDS CANADIEN POUR
L'ENSEIGNEMENT DENTAIRE



Chairman's Message

It is my great pleasure to report that the Canadian Fund for Dental Education has provided over three million dollars in assistance to dental research and education in Canada since its beginning in October 1962.

Throughout the years, CFDE has been dedicated to promoting dental excellence by funding an array of dental programs which continue to guarantee increased public awareness and the advancement of dental research in all regions of Canada. Each of these programs and the individuals involved has received needed funds that would otherwise have been unavailable to them.

The CFDE owes its vitality and success to its many loyal contributors from coast to coast, upon whom we have come to depend. We are pleased to list these sponsors in the Honour Roll presented later in this report.

The Fund extends its sincere appreciation to these many individuals, corporations and organizations whose generous contributions have made possible the good work of the Fund in 1990 and years past.

As this will be my final report as Chairman of the CFDE, I would like to thank my fellow Trustees, the members of the Fund's Advisory Committee, and Julie Hentschel, Fund Administrator, for their time and talents, and for making my job as Chairman a most challenging and rewarding experience.

In these uncertain economic times, the CFDE, with your help, can continue its commitment to dental excellence in Canada. Together we can realize the opportunities before us by generously supporting dentistry. Together we can make a contribution to the future of our profession.

Message du président

Il me fait grand plaisir de souligner que, depuis sa création en 1962, le Fonds canadien pour l'enseignement dentaire a versé plus de trois millions de dollars pour aider la recherche et l'enseignement dentaires au Canada.

Au fil des ans, le FCED s'est voué à la promotion de l'excellence en finançant une gamme de programmes qui continuent d'assurer une plus grande sensibilisation de la population à la santé dentaire et l'avancement de la recherche dans toutes les régions du pays. Ces programmes et les personnes concernées ont ainsi reçu l'aide financière dont ils avaient besoin et ils n'auraient pu obtenir autrement.

Le FCED doit son dynamisme et sa réussite à ses nombreux et loyaux donateurs dont il dépend d'un océan à l'autre. C'est avec fierté que nous les présentons au Tableau d'honneur du présent rapport.

Le Fonds exprime toute sa reconnaissance envers ces nombreuses personnes, sociétés et organisations dont la générosité lui a permis de poursuivre sa démarche en 1990 comme dans le passé.

Comme ceci est mon dernier rapport à titre de président du conseil du FCED, j'aimerais remercier mes collègues fiduciaires, les membres du comité consultatif ainsi que madame Julie Hentschel, administratrice du Fonds. Leur dévouement et leurs talents ont fait de mon séjour à la présidence du conseil une expérience des plus stimulantes et des plus satisfaisantes.

En ces temps d'incertitude économique, le FCED pourra, avec votre aide, poursuivre ses engagements dans la recherche de l'excellence pour notre profession au Canada. En apportant généreusement notre appui à la médecine dentaire, nous pourrons réaliser ensemble les perspectives qui s'offrent à nous et contribuer ainsi à façonner l'avenir de la profession.

Dr. T.E.M. Ramage

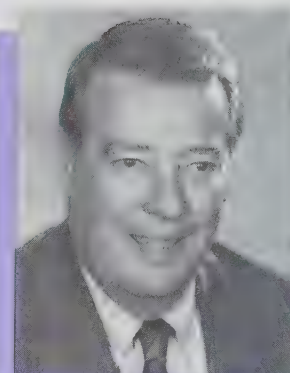
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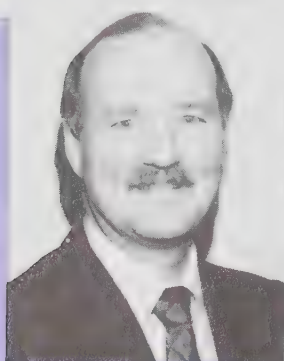
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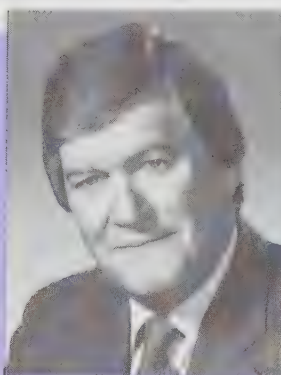
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Edmonton, Alberta



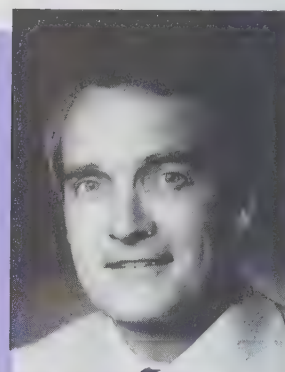
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Vice-chairman/Vice-président
Dental Industry/Industrie dentaire



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Halifax, Nova Scotia



A. Jardine Neilson
CDA Executive Director/
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Saskatoon, Saskatchewan



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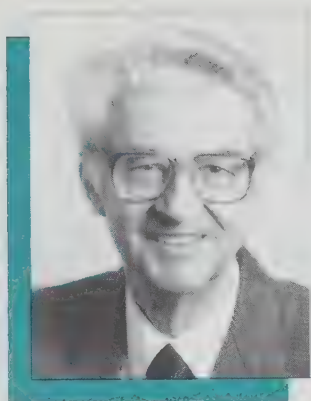


Robert Dupont, D.D.S.
Montréal, Québec

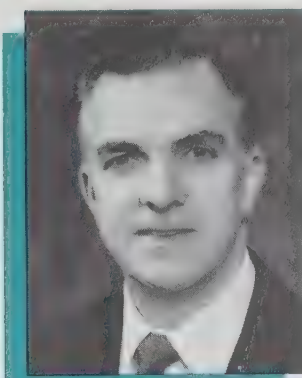


Arthur Zwingenberger
Dental Industry/Industrie dentaire
Toronto, Ontario

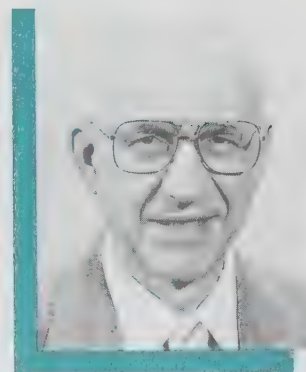
Advisory Committee on Fellowship Selection/ Comité d'avisers sur l'octroi des bourses



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Julie Hentschel
Fund Administrator/Administrateur
du Fonds

CFDE Office/Bureau du FCED
1815 promenade Alta Vista Drive
Ottawa, Ontario
K1G 3Y6
Telephone (613) 731-0493

Five Ways To Support CFDE - Now and in Perpetuity

CFDE is the only national, non-profit organization designed to secure funds for the promotion of good dental health through education, research and service.

To share CFDE's concern for the profession and the public, consider the following ways you can help:

- * With an annual unrestricted contribution.
- * With a living memorial honouring the memory of a friend, colleague or loved one.
- * With a tribute gift to mark all the important events in the lives of those close to you.
- * With a bequest in your will.
- * With a personal endowment, now or in your will, for the benefit of dental health in perpetuity.

CFDE - your opportunity to serve the future of dentistry!

Cinq façons de contribuer au FCED - maintenant et à perpétuité

Le FCED est le seul organisme sans but lucratif, d'échelle nationale, qui recueille des fonds destinés à la promotion de la santé dentaire au moyen d'enseignement, de recherche et de services.

Vous pouvez partager l'intérêt que porte le FCED à la profession et au public des cinq façons suivantes:

- * Grâce à une contribution annuelle sans restrictions,
- * à un don commémoratif en mémoire d'un ami, d'un collègue ou d'une personne bien-aimée,
- * à une carte de témoignage destinée à marquer une occasion spéciale dans la vie de ceux qui vous sont proches.
- * à un legs dans votre testament,
- * à un fonds personnel de dotation, maintenant ou dans votre testament, au profit de la santé dentaire à perpétuité

Le FCED - il n'y a pas de meilleure façon de secourir la profession!

Highlights of 1990 Income

Voluntary contributions of \$329,934 to CFDE in 1990 were greater than in any previous year and reflected an increase of 24% over 1989. A substantial gain of \$13,300 in sundry income is due to repayments of fellowship awards because of unfulfilled teaching commitments. The \$5,000 rise in investment income represents favourable interest rates for the past year and a sound CFDE investment plan.

Perhaps the most encouraging of many exciting achievements was the substantial growth in gifts from the profession. Donations from dentists increased by 12% to \$101,604 from last year, and those earmarked for the Nicholas A. Mancini Fund, the Murray McDonald Memorial Fund, and the George W. Barrett Memorial Fund saw a boost in revenue of \$19,282.

Three new Funds were initiated in 1990. The Thomas Curry Memorial Fund, the Don Winget Memorial Fund, and the Charles Hunt Fund collectively received donations totalling \$16,362. It is expected that within five years, each Fund will reach \$10,000. At that time, set guidelines will be applied to determine how each Fund is to be designated.

Support from dental organizations rose to 62% over last year. We gratefully acknowledge the increased support from allied dental health professionals and organizations to \$4,320 from \$3,037 in 1989.

Business and industry again responded generously with contributions of \$112,257 in support of CFDE programs.

Special mention must be made of the generous donation of \$25,000 received from the Lorne E. MacLachlan Estate, whose annual income, beyond the original \$150,000 endowment, established for teacher training in prosthodontics, will support general teaching and research programs.

Aperçu des recettes de 1990

Les contributions volontaires, qui s'élevèrent à 329 934 \$, ont atteint un nouveau sommet en 1990 et marqué une hausse de 24 % par rapport à l'année précédente. L'importance des recettes diverses, 13 300 \$, est attribuable au remboursement de certaines bourses dont les engagements en matière d'enseignement ne furent pas remplis. Quant à la hausse de 5 000 \$ au chapitre des investissements, elle est attribuable aux taux d'intérêt favorables de l'année dernière et à la solidité du plan d'investissement du FCED.

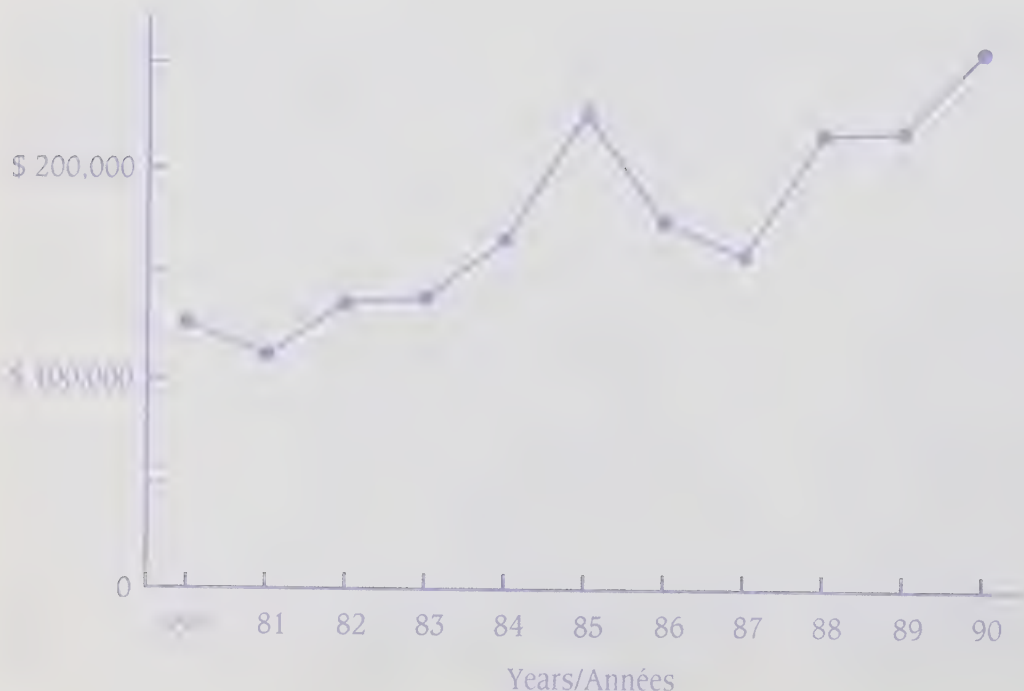
La hausse considérable des dons versés par les collègues de la profession fut probablement la plus encourageante des nombreuses et intéressantes réalisations de l'année. Les dons des dentistes ont en effet monté de 12 % par rapport à l'année dernière, atteignant 101 604 \$. Les fonds Nicholas A Mancini, Murray McDonald et George W. Barrett ont vu les sommes désignées à leur intention monter de 19 282 \$.

Trois nouveaux fonds ont été créés en 1990. Ce sont les fonds Thomas Curry, Don Winget et Charles Hunt, qui ont recueilli ensemble 16 362 \$. On s'attend à ce que chacun cumule la somme de 10 000 \$ en cinq ans. On appliquera alors des lignes directrices concernant la répartition de chaque fonds.

L'appui des organisations dentaires est passé à 62 % l'année dernière. Nous remercions les professions et les organisations connexes de la santé dont les contributions sont passées de 3 037 \$ en 1989 à 4 320 \$ l'année dernière.

Les milieux d'affaires et l'industrie ont de nouveau répondu généreusement à notre appel en versant 112 257 \$ pour soutenir nos programmes.

À noter de façon particulière la généreuse contribution de 25 000 \$ que nous avons reçue de la succession Lorne E. MacLachlan et dont le revenu annuel, au-delà du legs original de 150 000 \$ pour favoriser la formation de professeurs en prothèse dentaire, viendra appuyer les programmes d'enseignement et de recherche.



CFDE assistance to dentistry
in the past ten years

L'appui financier apporté par
le FCED à la médecine
dentaire depuis les
dix dernières années

Grants Awarded In 1990

Brief descriptions of selected projects supported by the CFDE follow:

ACFD Teaching and Management Institutes	\$ 42,000
Part of an approved three-year program, support for 1990 went to the Deans' and Faculty Development Institute; organized to develop an effective, long-term, local faculty development program at each institution.	
CDA Dental Health Month Program	10,000
The 1990 grant was used towards the development, production and distribution of the Dental Health Month material.	
First Teeth Program	35,000
A program targeted for parents of children under nine years of age, emphasizing the importance and care of first teeth. For the fourth consecutive year, a special donation from Colgate-Palmolive Canada made this program possible.	
Teaching Conference	16,000
Titled "Nutrition in Dentistry" Support included a generous \$6,000 earmarked donation from The NutraSweet Co.	
Student Clinician Program	8,707
Through the sponsorship of Dentsply Canada Limited, student representatives from each Canadian dental faculty attend the CDA Convention annually to participate in this program.	
RCDC Examiners' Workshop	5,000
Thirty examiners and 4 observers introduced steps towards production of an evaluation system for the examination process.	
CDADAT Admissions Workshop	6,500
A means of sharing information, problems and concerns among the ten dental schools.	
Toxicity of Silver Amalgam	10,000
Dr. Derek W. Jones, Dalhousie University, supported for proposal entitled "Risk Assessment of Health Hazards due to Mercury from Dental Amalgam" from earmarked donation by Ash Temple Limited.	
ISO Meeting in Beijing, China	3,000
A Canadian delegation of four dentists received support for representing Canada; generously funded by Ash Temple Limited.	
Dalhousie Pediatric Research	5,000
An ardent and loyal supporter of dental education and research in Canada requested anonymity.	
Wrigley Dental Student Research Awards Program	4,000
Wrigley Canada Inc. has provided funds to annually sponsor awards to dental students involved in research projects in any area of Oral Biology, with preference for the benefits of salivary stimulation and caries reduction. In 1991 the Wrigley Program commitment will increase to \$10,000.	
Document on Addiction in Dentistry	10,000
Dr. Arthur Williams' paper entitled "Dentistry Faces Addiction" is scheduled for publication in the CDA Journal in 1991.	
Nicholas A. Mancini & George W. Barrett	2,000
Memorial Grants to Needy Students Two students were assisted with grants for undergraduate students in extreme financial difficulty.	
CDAA Dental Assisting Exam	5,000
Grant provided to the Canadian Dental Assistants Association for the development of the National Level I Exam.	
ODHA Educational Projects	2,000
Five applications from Ontario dental hygiene programs received support under the Warner-Lambert Canada Inc. sponsored award program.	
CFDE Teacher Training Fellowships	26,000
Eleven applicants received fellowship awards in 1990, including two Warner-Lambert Canada Inc. sponsored awards for existing dental and dental hygiene teachers (\$5,000), and the Henry M. Thornton Award (\$1,000) from Dentsply Canada Limited, for the most meritorious applicant.	
Grants to Dental Faculties	35,000
Unrestricted grants of \$1,500 and two undergraduate grants of \$1,000 are awarded annually to each of the ten dental faculties.	

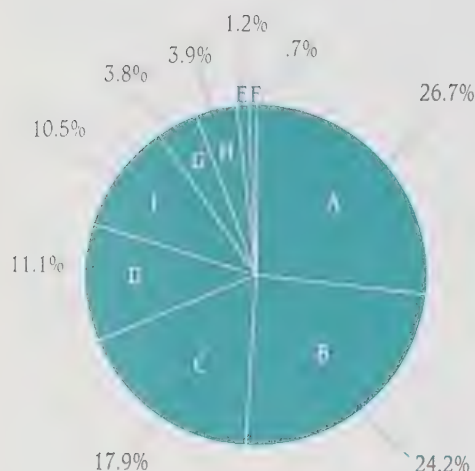
Bourses attribuées en 1990

Voici une brève description des projets que le FCED a retenus et appuyés au cours de l'année.

Instituts de recherche et de gestion de l'ACFD	42 000 \$
Élément d'un programme de trois ans. En 1990, l'appui est allé à l'Institut de perfectionnement des doyens et des facultés, qui avait pour objet de mettre au point un programme local efficace et à long terme de perfectionnement pour chaque faculté.	
Programme du Mois de la santé dentaire de l'ADC	10 000 \$
La subvention de 1990 a servi à l'élaboration, à la production et à la diffusion du matériel du Mois de la santé dentaire.	
Programme des Dents de lait	35 000 \$
Ce programme s'adresse aux parents qui ont des enfants de moins de neuf ans et met l'accent sur le soin des dents primaires. Ce programme est rendu possible pour la quatrième année consécutive grâce à une subvention spéciale de Colgate-Palmolive Canada.	
Conférence sur l'enseignement	16 000 \$
Sujet : Nutrition et médecine dentaire. La société Nutrasweet a contribué généreusement la somme de 6 000 \$ à ce projet.	
Clinique étudiante	8 707 \$
Sous les auspices de la société Dentsply Canada Ltée, des étudiants de toutes les facultés dentaires du pays participent ainsi à la clinique étudiante du congrès annuel de l'ADC.	
Atelier des examinateurs du CRDC	5 000 \$
Trente examinateurs et quatre observateurs ont entrepris de développer un système d'évaluation des examens.	
Atelier sur l'admission au TAED	6 500 \$
Initiative permettant aux dix facultés dentaires d'échanger de l'information, de partager leurs préoccupations et leurs problèmes.	
La toxicité de l'amalgame d'argent	10 000 \$
Le docteur Derek W. Jones, de l'université Dalhousie, a reçu l'appui d'un don particulier d'Ash Temple Limitée pour son projet portant sur l'évaluation des risques pour la santé attribuables au mercure des amalgames dentaires.	
Réunion de l'ISO à Pékin (Chine)	3 000 \$
Une délégation de quatre dentistes a représenté le Canada, grâce à l'appui d'Ash Temple Limitée.	
Recherche en pédiatrie à Dalhousie	5 000 \$
Don d'un ardent et loyal partisan de l'enseignement et de la recherche dentaire au Canada, qui a demandé de garder l'anonymat.	
Bourses Wrigley de recherche étudiante en dentisterie	4 000 \$
Wrigley Canada inc. a établi un fonds qui permet d'attribuer annuellement à un étudiant des bourses de recherche dans le domaine de la biologie buccale, et notamment sur les avantages de la stimulation de la salivation et de la réduction de la carie. En 1991, Wrigley haussera son engagement à 10 000 \$.	
Document sur la toxicomanie en dentisterie	10 000 \$
Le document du docteur Arthur Williams sera publié en 1991 dans le Journal de l'ADC.	
Subventions aux étudiants dans le besoin	2 000 \$
Ces subventions qui portent les noms des docteurs Nicholas A. Mancini et George W. Barrett ont permis d'aider deux étudiants qui se trouvaient dans de sérieuses difficultés de poursuivre leurs études de premier cycle.	
Examen de l'ACAD en assistance dentaire	5 000 \$
Subvention versée à l'Association canadienne des assistant(e)s dentaires pour mettre au point un examen de niveau I à l'échelle du pays.	
Projet éducatif de l'ODHA	2 000 \$
Cinq programmes ontariens d'éducation en hygiène dentaire ont reçu un appui grâce au fonds de soutien de Warner-Lambert Canada inc.	
Bourses de perfectionnement des professeurs du FCED	26 000 \$
Onze candidats ont reçu la bourse en 1990, y compris deux bourses versées par Warner-Lambert Canada inc. à des professeurs en dentisterie et en hygiène dentaire (5 000 \$) et la bourse Henry M. Thornton (1 000 \$) de Dentsply Canada limitée pour le candidat le plus méritoire.	
Subventions aux facultés dentaires	35 000 \$
Subventions sans restriction de 1 500 \$ et deux bourses de premier cycle de 1 000 \$ sont versées tous les ans à chacune des dix facultés de médecine dentaire.	

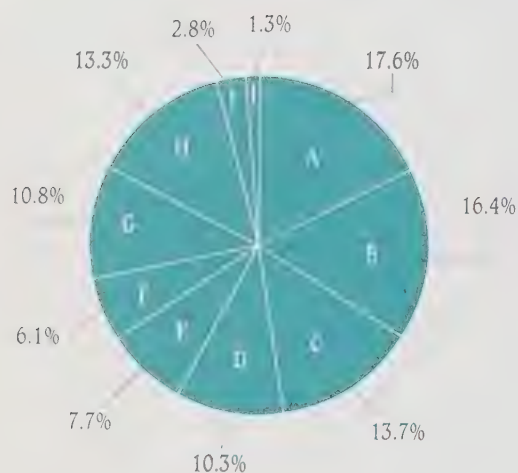
Financial Highlights / Faits Financiers Marquants 1990

Income by Source / Revenus et provenance



	1990	1989
A. Business and industry Entreprises et industrie	\$ 112,257	\$ 113,370
B. Dental profession Profession dentaire	101,604	90,572
C. Investment and sundry income Revenus de placement et de sources divers	75,114	70,922
D. Dental/Allied Dental Health organizations Organismes dentaires associés	46,499	27,824
E. In Memoriam Dons commémoratifs	5,200	8,685
F. Allied Dental Health professionals Professionnels en santé dentaire associés	2,820	660
G. Tributes and other contributors Hommages et autres contributions	15,877	8,466
H. Developing funds/Fonds en développement	16,362	—
Operational income Revenus d'exploitation	375,733	320,499
I. Gifts to Endowment Funds Dons aux fonds de dotation	44,282	16,135
TOTAL	\$ 420,015	\$ 336,634

Dentistry has been enhanced by these grants La médecine dentaire a progressé grâce à ces subventions



A. Dental health month, "First Teeth", and other dental awareness programs Mois de la santé dentaire et autres programmes d'information	\$ 45,000	\$ 55,500
B. Summer program to improve teaching skills of dental faculty members Programme d'été de perfectionnement des compétences pédagogiques des membres des facultés dentaires	42,000	38,000
C. Grants to dental schools Subventions à des écoles dentaires	35,000	35,000
D. Teacher training fellowships (dentists and dental hygiene) Bourses de formation en enseignement (dentistes et hygiénistes dentaires)	26,000	22,000
E. Student table clinics and conference Conférence et exposés d'étudiants	19,707	20,438
F. Dr. Lorne E. MacLachlan Endowment/Teacher training in prosthodontics Fonds de dotation Dr Lorne E. MacLachlan/formation d'enseignants en prosthodontie	15,723	13,752
G. Dental conferences and workshops Conférences et ateliers en médecine dentaire	27,500	20,700
H. Special programs/Programmes spéciaux	34,000	—
I. Dental auxiliary projects Atelier d'hygiène dentaire et projets de formation	7,200	3,950
J. Murray M. McDonald Memorial Lecture Conférence commémorative: Murray M. McDonald	3,500	5,995
TOTAL	\$ 255,631	\$ 215,335

Our records have been audited by Peat Marwick Thorne.
A copy of their report is available upon request.

Notre comptabilité a été vérifiée par Peat Marwick Thorne.
On pourra se procurer un exemplaire de leur rapport en faisant une demande à cet effet.

Honour Roll/Tableau d'Honneur

Business, Industry and Dental Organizations Entreprises, Industrie et Organismes Dentaires

Honorary Founders/Donateurs éminents (\$25,000 and over - et plus)

- *Canadian Dental Association Ottawa, Ontario
- *Colgate-Palmolive, Toronto, Ontario
- Dr. Lorne E. MacLachlan Charitable Trust
Ottawa, Ontario

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- *Dentsply Canada Limited and subsidiaries
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- *Ash Temple Limited, Don Mills, Ontario
- *Canadian Dental Service Plans Inc.
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- *Medi-Dent Service, Burlington, Ontario
- *Royal Canadian Dental Corps Association
Ottawa, Ontario
- The NutraSweet Company, Mississauga, Ontario
- *Warner-Lambert Canada Inc.
Scarborough, Ontario
- *Wrigley Canada Inc., Don Mills, Ontario

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- *Clift's Dental Supplies Ltd., St. John's, NFLD
- *College of Dental Surgeons of BC
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- Confederation Leasing Limited, Toronto, Ontario
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- *Nova Scotia Dental Association
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Saint John, New Brunswick
Anonymous, Halifax, Nova Scotia
Dr. H.F. Biewald, Ottawa, Ontario

Le FCED désire exprimer sa gratitude aux bienfaiteurs suivants qui lui ont versé des dons de 500\$ et plus:

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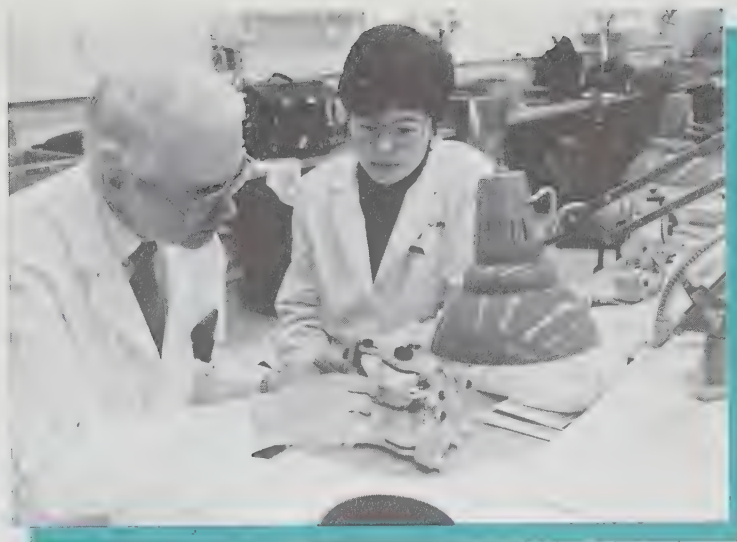
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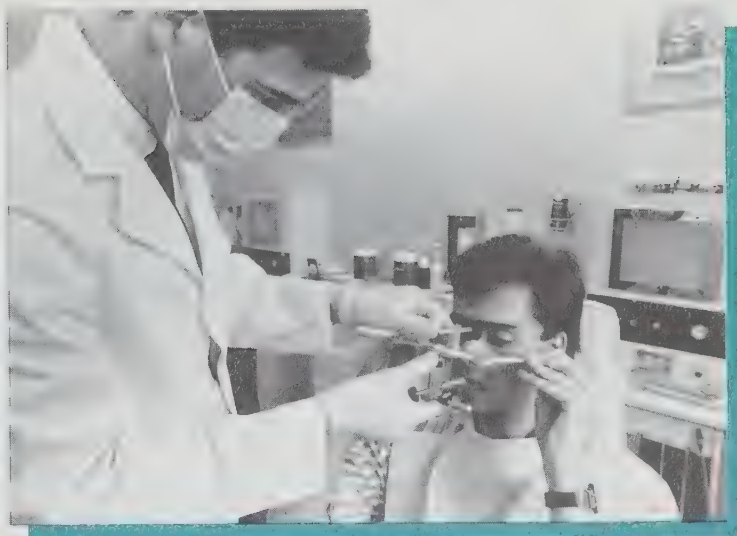


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This Book of Remembrance contains the names of all members and friends of the profession in whose memory contributions have been made to the CFDE. The Book of Remembrance is permanently displayed in the CFDE office which is housed in the Canadian Dental Association building. A card acknowledging each in memoriam contribution is sent to the bereaved family.

During 1990, fifty-three men and women were remembered with Living Memorial Contributions by the profession and its friends. In all, \$5,200 was given in their names for the future of dental education.

Ce livre contient les noms de tous les membres et amis de la profession dentaire en mémoire de qui des contributions furent faites au Fonds du souvenir du FCED. Il est conservé au siège social de l'Association Dentaire Canadienne. Dans chaque cas, les proches parents reçoivent un accusé de réception particulier.

Au cours de 1990, la profession dentaire et ses amis rappelèrent la mémoire de cinquante-trois hommes et femmes par leurs dons au Fonds du souvenir. En tout, 5 200 \$ furent ainsi consentis en leur nom à l'éducation dentaire.

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